

COLUMBIA LIBRARIES OFFSITE

HEALTH SCIENCES RESTRICTED



HR00058742

RECAP

U.S. Public Health service.

Annual report of the surgeon
General.

SERIAL

Columbia University
in the City of New York

COLLEGE OF
PHYSICIANS AND SURGEONS
LIBRARY





Digitized by the Internet Archive
in 2010 with funding from
Open Knowledge Commons

Treasury Department.

Marine-Hospital Service.

ANNUAL REPORT

OF THE

SUPERVISING SURGEON-GENERAL

OF THE

MARINE-HOSPITAL SERVICE OF THE UNITED STATES

FOR THE

FISCAL YEAR 1889.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1889.

TREASURY DEPARTMENT,
Document No. 1245.
Marine-Hospital Service.



OPERATIONS

•OF THE

UNITED STATES MARINE-HOSPITAL SERVICE.

1889.

CONTENTS.

Report to the Secretary	9-128
Receipts and expenditures	129-132
The public health	9
The field of the central bureau	9, 10
Resolutions of Florida legislature	16, 17
Diagnosis of yellow fever	17-22
Treatment of yellow fever	22-49
Camp Perry	49-52
United States inspection service	52-60
Yellow fever in Tampa, Plant City, and Palmetto	60-76
Yellow fever at Fernandina	76-85
Yellow fever at Gainesville	85-95
Yellow fever at Macclenny	96-99
Observation on chagres fever	100-103
Quarantine appliances	103
The hygienic laboratory	104, 105
Purveying division	105, 106
Organization of the bureau	106-109
Changes in the Medical Corps	109
National quarantines	109-114
Post epidemic disinfection	114-116
Marine hospitals	116-120
Relief furnished	120-128
Financial statement	129-132
Report on the prevention of yellow fever by inoculation	133-239
Selected cases from hospital practice	241-285
Report of surgical operations	286-292
Report of fatal cases with necropsies	295-410
Statistical tables	413-470

REPORT.

TREASURY DEPARTMENT,
MARINE-HOSPITAL BUREAU,
Washington, September 1, 1889.

SIR: I have the honor to make the following report of the operations of the Marine-Hospital Service of the United States for the fiscal year ended June 30, 1890, being the ninetieth year of the Service and its sixteenth annual report.

THE PUBLIC HEALTH.

No general epidemic has visited the country since the disappearance of the yellow fever at Jacksonville and various points in Florida. The active measures of disinfection practiced have doubtless contributed more to that result than any one factor. The subsequent establishment of a State board of health in Florida, with full power; its rapid organization and great vigilance, is an important gain to the national defenses against disease. Under our system of government, it is to the proper equipment and support of the State boards that we must look for the greatest advances in raising the standard of the public health within their territories. No central bureau or department can be large enough to undertake the general municipal sanitary work of the several States, and if there were no constitutional objections, in practice it would be an unwieldy and cumbersome machine.

THE FIELD OF THE CENTRAL BUREAU.

The Central Bureau, properly equipped, supported by liberal appropriations and empowered by law, can effectually guard against the introduction of contagious diseases from abroad, by means of information from consulates and the proper administration of the quarantines. The Bureau can effectively aid the State boards on the occasion of special epidemics, by sending skilled inspectors; the management of inland quarantines; the settlement of the varied and never-ending questions requiring a well-equipped laboratory and trained expert knowl-

edge for their elucidation, and the dissemination of the information obtained from all sources.

The work is thus outlined in a few words, but the labor involved is vast, and the results can but dimly be foreseen. The venerable Professor Davis, himself a pioneer in American State Medicine, said at the last meeting of the American Medical Association that this Bureau has now become "a health department in all but in name,"* and the accomplished secretary of the Tennessee Board of Health, in his address as chairman of the section on State Medicine, said: †

There is now at Washington nearly all the provision or machinery of a health department worthy this mighty people, which yet does not satisfy the public demand, for want of enlargement and co-ordination. A Service nearly a century old, established originally as an act of charity to a heedless class, and supported by a tax upon that class, has, by a singularly interesting process of evolution, expanded into a Bureau with four exceedingly important drawers. The care of the United States Marine Hospitals, once its sole function and the cause of its creation, is now only one of its duties, a great charity though it be, with a chain of splendid buildings perfectly equipped and ably managed. All honor to him who conceived the idea of elevating this service from the low estate into which partisan administration had reduced it. All honor to those who have changed it from sinecure posts for party reward to scientific positions for genuine merit.

Last year, in pursuance with an earnest request from the American Medical Association, Congress greatly enlarged the ability of this Service to take charge of the maritime quarantine, so that now this, one of the chief functions of a National Health Bureau, is by common consent placed in its hands, with funds and powers amply sufficient for most efficient work. Surely this addendum far outweighs in importance and esteem its moderate hospital work.

Curiously enough, last year also a threatened epidemic of yellow fever brought a demand upon the central Government for assistance which could not be refused, inasmuch as a contingent fund for just such purposes had been placed to the order of the President, who could find no other channel through which to extend relief than this same old seaman's friend. Thus interstate quarantine and aid fell under its wing. And though this may be a temporary work, yet when occasion does occur for its performance, in magnitude and importance it dwarfs even maritime quarantine.

A fourth drawer in this nondescript Bureau is the direction of investigations throwing light upon the causes and prevention of diseases, which has been committed to its charge in more than one instance by act of Congress during the few years just passed.

Thus it would seem that the United States Marine-Hospital Service has altogether outgrown its name. It should be styled the United States Public Health Service, while retaining essentially its present organization. Maritime quarantine, interstate quarantine and aid, and scientific researches, with its original work, should constitute four separate sub-departments with ample funds and full clerical force. The head of the whole should be, as now, a Supervising Surgeon-General. This is better than a Bureau with a political appointee at its head. The term Service is significant and it is popular.

THE QUARANTINE CONFERENCE AT MONTGOMERY.

The event of the most importance in the administration of quarantine matters was the Quarantine Conference held in Montgomery, Ala., pur-

* Journal American Medical Association, July, 1889.

† Dr. J. Berrien Lindsley, Journal American Medical Association, July 13, 1889.

suant to a joint resolution of the general assembly of Alabama. The following circular, by the accomplished State health officer, Dr. Jerome Cochran, explains fully its object and purposes :

Quarantine Conference.—Circular letter.

This circular letter is specially addressed to the health authorities of the several States most directly interested in the protection of the South against invasion of yellow fever. Copies of it will also be sent to the governors of the several States referred to, and to the mayors of some of the more important cities, for their information and with a view of enlisting intelligent interest in the undertaking herein explained.

Under a joint resolution of our general assembly the governor of the State of Alabama has issued to the governors of the States of Texas, Florida, Louisiana, Mississippi, South Carolina, North Carolina, Georgia, Tennessee, Kentucky, and Illinois invitations to appoint delegates to a Quarantine Conference to be held in the city of Montgomery, beginning on Tuesday, the 5th of March next, and to continue for such number of days as the business in hand may render necessary.

About two weeks ago Dr. C. P. Wilkinson, president of the board of health of the State of Louisiana, addressed a circular letter to the health authorities of these same States, suggesting a similar conference to be held in the city of Jacksonville, Fla. I have been in correspondence with Dr. Wilkinson, and the assemblage of the proposed conference in Montgomery meets with his approval.

The object of the conference can not be easily overrated. It is to formulate, in a way that will command the confidence of the general public and of the civil and sanitary authorities of the States concerned, and, in the light of our latest experience and information, the principles and regulations which should govern our Southern quarantines, and at the same time to arrange such plans for harmony and concert of action as may seem practicable and desirable.

It is earnestly desired that all of the States included in the invitation shall be represented in the conference by full delegations of such of their citizens as are best fitted to discuss the theoretical and practical problems involved in the rational administration of quarantine in the South. The occasion ought to be made a very memorable one.

The conference proper will be composed exclusively of the duly accredited delegates of the States; but other persons interested in quarantine matters will be heartily welcomed to seats on the floor, and to take such part in the discussions as under the circumstances may seem expedient.

To facilitate the work of the conference, experts believed to be specially qualified will be requested to formulate in advance for discussion, a series of propositions covering the subjects of maritime quarantine, railroad quarantine, municipal quarantine, depopulation of infected towns, refugee camps, panics, stampedes, disinfection, health certificates, etc.

We desire the assistance and co-operation of all who have had experience in the management of quarantines, and of all who have studied the progress of epidemics of yellow fever. Suggestions through the mails will be thankfully received.

All persons receiving this circular letter will confer a favor by acknowledging its reception, and notifying us what themselves and the communities they represent can be depended on to contribute to the success of the conference.

Address all communications to

JEROME COCHRAN, M. D.,
State Health Officer.

MONTGOMERY, ALA., January 10, 1889.

The conference was called to order March 5, 1889, by Dr. Cochran, State health officer, and Dr. C. P. Wilkinson, president of the State board of health of Louisiana, was elected president.

In regard to notification of diseases, the conference agreed to the following resolution, and on motion the Marine-Hospital Service was included in the scheme of inter-state notification :

Resolved, That this convention urge upon all health authorities of States represented in it the importance of strict compliance with the agreement of interstate notification adopted by the national conference of State boards of health, and the sanitary council of the Mississippi Valley, in regard to all communicable diseases, and especially in regard to yellow fever.

The question of the depopulation of a place on the appearance of yellow fever was fully considered, and, on motion of Dr. Seelye, the following was adopted as the sense of the conference :

Resolved, In the beginning of an outbreak of yellow fever there is no need of depopulation at all, except of infected houses or infected districts; but if people who are able to afford the expense desire to leave they should do so quietly and deliberately, and no obstacles should be placed in their way; and those who leave healthy districts of the city or town should go wherever they please, without let or hindrance.

Persons living in infected houses or infected districts should be encouraged to leave, but should be allowed to leave only under such restrictions as will afford reasonable guarantees of safety to the communities in which they find asylum; and they should be sent only to such communities as are willing to receive them.

In the depopulation of infected houses or of special infected districts, the inhabitants should be removed into camps of probation, or into vacant houses in the adjacent country. After ten days' detention, if they remain well, and under proper regulations, such as disinfection of baggage, they should be considered free from danger, and allowed to go freely into any community willing to receive them.

The following resolution was also adopted in regard to the national quarantine stations now managed by the Service as refuge stations on the Atlantic and Gulf coasts :

The refuge stations as at present operated on the sea-coast of the United States are, in the opinion of this body, of infinite service, and we would recommend their continuance and full equipment for all requirements.

A motion was made to substitute resolutions favoring the enactment of a law providing the appointment of a health commissioner, but, on motion, it was tabled.

Inland quarantines.

The following resolutions were adopted :

A well-digested quarantine formula, making and promulgating the necessary rules and regulations for enforcing the same, should be prepared, ready to be put in force, when necessary to do so, at all points where it is necessary to put quarantine in force. These rules should be published for general information, to enable all persons to comply with the same, and displayed by placard in every depot.

At quarantine stations accommodations should be provided for caring for such

persons, if any, as may be detained or are not permitted to pass through such stations, while in transit, until they can be disposed of.

Only competent physicians, who have had experience with contagious and infectious diseases, should be made inspectors at quarantine stations, whose duty it shall be to inspect and examine the condition of passengers, baggage, and express matter. All inspectors should have the power to administer oaths, and to remove from the trains and detain at quarantine stations such passengers, baggage, or express matter, etc., as may be found necessary to prevent the introduction or spread of infectious diseases of any kind.

The following in regard to method of the practice of quarantine was passed:

Resolved, That this conference indorse the Holt quarantine and disinfection system, as at present operated at New Orleans, La., as the best one known for the prevention of the introduction of yellow fever into the ports of the United States, and recommend its uniform adoption.

The following topic was discussed under the head of

Isolation.

Topic 6.—On the occurrence of a case of yellow fever, what immediate measures of isolation are desirable?

Upon motion of Dr. Cochran, the following resolutions were adopted as the answer to topic 6:

Resolved, (1) When one case or a few cases of yellow fever occur in any community, it does not follow of necessity that the disease must spread and become epidemic. On the contrary, the experience of many countries through long periods of time shows conclusively that in the majority of such instances, and without the observance of any special means of prophylaxis, the disease fails to spread.

(2) When one case or a few cases of yellow fever occur in any community, in the light of our present knowledge of the habits and modes of propagation of the disease, it is generally possible, by the employment of the proper prophylactic measures, to prevent the development of an epidemic.

(3) The golden rule for the prevention of yellow fever is non-intercourse—isolation—the keeping of the well away from the sick, away from infected things, and, very especially, away from infected localities.

(4) In the enforcement of this golden rule of non-intercourse, two problems present themselves for solution. (a) To keep the people generally from coming into the infected houses and the infected localities; and (b) to keep doctors and nurses and other attendants, and the well members of sick families, from visiting and mingling with people outside of the infected houses and localities. The solution of the first of these problems is comparatively easy. The solution of the second is sufficiently difficult. But it is possible to solve them both.

(5) In the densely settled sections of cities guards may be useful for the enforcement of non-intercourse. They are much less needed in sparsely settled towns. In villages and country neighborhoods, as a rule, they are not needed at all. In all cases every intelligent family should be able to take care of itself; should be able to keep all of its members away from infected houses and localities, and to guard its own premises from invasion by dangerous persons and things.

(6) Non-intercourse may be practiced in the very center of an infected district with considerable probability of escaping the fever. Cloistered convents and prisons in

infected cities, with yellow fever raging all around them, usually escape invasions; and there are numerous instances on record in which private families in the midst of epidemics have passed the ordeal safely by the vigorous enforcement of non-intercourse.

General disinfection.

In regard to general disinfection the following resolution, introduced by Dr. T. Grange Simons, of South Carolina, and Dr. Thomas F. Wood, of North Carolina, was adopted as the sense of the conference:

Resolved, That this conference recommend that all approved methods of disinfection by means of personal and municipal cleanliness, by ventilation, fumigation, chemical effusion, destruction by fire of all infected or suspected things used during an epidemic of yellow fever and until the danger of its spread shall have passed, and that all fomites should be disinfected after the recovery of the sick.

We recommend as a basis of disinfection the processes as set forth by the committee on disinfectants of the American Public Health Association.

Miscellaneous resolutions adopted by the conference.

Dr. Wilkinson introduced the following resolution, which was unanimously adopted as the sense of the conference:

Resolved, That the Secretary of the Treasury of the United States is hereby requested to increase the revenue patrol service on the coast of Florida to such extent as may be necessary to prevent smuggling.

The following resolutions, introduced by Drs. Wood, Foster, and Hamilton, were adopted:

By Dr. Wood, of North Carolina: Whereas it appears by the report which Dr. Burgess has made to this conference that sanitary inspection of vessels where yellow fever is endemic is of vital importance; therefore be it

Resolved, That this conference approves the plan of having medical inspectors attached to those consulates where yellow fever and cholera are endemic, with a view of securing for our protection definite information as to the exact sanitary condition and the presence or absence of contagious diseases in such consular district, and that Congress be urged to make the necessary appropriations to carry this plan into effect.

By Dr. Foster, of Georgia: *Resolved*, That the United States Government is hereby requested, if compatible with international and constitutional law, to enter into negotiations with Spain with a view of investing the United States sanitary inspectors at Spanish ports with such legal jurisdiction as may be necessary for the enforcement of such rules and requirements as are provided.

By Dr. Hamilton: *Resolved*, That this conference is of opinion that it is a duty devolving on all nations to take measures to eradicate any plague centers from their territory, and that the existence of such plague centers is a menace to all other nations, and that our State Department be requested to take measures through proper diplomatic channels for the conveyance of this opinion to the governments deemed obnoxious to the opinion as herein expressed.*

* This resolution was also adopted at the last meeting of the American Medical Association, held at Newport.

Return of refugees.

In answer to the question of when refugees may safely return to their homes after the existence of yellow fever in a place, on motion of Dr. Hier, of Mississippi, the following was adopted :

After the occurrence of ice.

After the occurrence of three killing frosts.

After the occurrence of no cases of fever for the period of two weeks, and after thorough disinfection and ventilation of all localities infected and bedding and such other articles as are capable of conveying germs.

Rules for railroad quarantine.

The rules for the government of railroad quarantines, as drawn up by the special committee appointed for that purpose, are here subjoined.

The committee was composed of J. C. Clark, J. B. Baird, J. R. Porter, R. S. Starkweather, William Bailey, H. B. Horlbeck, J. E. Black, R. Rutherford, R. F. Gray, O. R. Early, and C. M. Smith.

RULES PREPARED BY THE COMMITTEE.

1. Quarantine should not be made against any place until it is officially known that yellow fever or other infectious or contagious disease exists at such place.

2. Only competent physicians should be put in charge of quarantine stations, and only thoroughly qualified persons should be employed as inspectors on railway trains.

3. Quarantine stations located on railroads should be established at convenient points, on one or both sides of a town or station, as may be deemed necessary.

4. If an epidemic of yellow fever or other infectious or contagious disease exist at a town or station, trains carrying passengers or freights should be required to pass through the limits of such towns or stations at a speed of not less 10 miles per hour, without stopping at such towns or stations, but should stop at the quarantine station.

5. Passengers to or from such infected point should only be received or delivered at the quarantine station, under the supervision of the quarantine officer in charge of the station.

6. Railway tickets may be sold to persons leaving an infected place to any point willing to receive them.

7. All baggage from any infected point should be properly disinfected.

8. As far as practicable, the same rules proposed for railroads should be applied to vessels of every kind, stage coaches, or other means of travel.

9. The passage of railroad trains through any point on the line of road, whether infected or not, should not be prohibited by any quarantine regulations. The conductors of passenger trains should close the windows and ventilators and lock the doors of cars passing through any place where a train is not permitted to stop.

10. All freight to any infected place should be delivered either at the quarantine station or the nearest railway station to such infected point, where it can be properly cared for.

11. All mail matter from any infected place should be properly disinfected by the United States Government; and mail matter intended for infected points should be put off the trains at the quarantine stations. The United States Government should instruct postmasters to receive and deliver mails at such quarantine stations.

12. Railroads and express companies may receive for transportation from any infected place, during the time such infection exists, any merchandise or traffic consigned to places willing to receive it.

13. State authorities should employ competent persons on passenger trains as inspectors of passengers, baggage, and express matter, as additional precaution; but the fact of inspectors being on such trains should not relieve trains carrying passengers or express matter or baggage from stopping at quarantine stations for such inspection as the officer in charge may determine to be necessary.

14. It is recommended that all quarantines, as far as practicable, should be uniform in their requirements and operations, which will greatly contribute to the prevention of panics, and tend to allay unnecessary excitement and fear on the part of the people.

15. The form of health certificate adopted by the quarantine convention, held at Montgomery March 5, 1889, should be prepared for health officers to issue, to such persons as may be found entitled to receive the same. A copy of this certificate should be printed with these rules, and conspicuously posted at railway stations.

16. It is the desire and intention of health authorities, as far as practicable, to throw every safeguard around the public health of all localities. Municipal, county, and State authorities are expected to co-operate in every possible way with health officers located in towns, villages, and cities, and in charge of quarantine stations, to enable them to prevent the introduction or spread of yellow fever or other infectious or contagious diseases.

RESOLUTIONS BY THE FLORIDA LEGISLATURE.

As a gratifying instance of the appreciation of the work of the service in Florida during the epidemic it is proper to record that the legislature of Florida passed the following resolutions:

NO. 2. SENATE CONCURRENT RESOLUTION.

Be it resolved by the legislature of the State of Florida: That we desire to place on record an expression of our confidence in Surgeon-General Hamilton, of the U. S. Marine Corps,* and to extend to him the thanks of the people of Florida, for his timely, intelligent, and efficient labors in their behalf during the past year; and be it

Further resolved, That the secretaries of the senate and house of representatives be instructed to forward an enrolled copy of these resolutions to Surgeon-General Hamilton, at Washington, D. C.

Approved February 18, 1889.

NO. 6. HOUSE RESOLUTION.

Whereas, during the late epidemic of yellow fever in this State, service of great magnitude was rendered the citizens of the stricken localities by the General Government of the United States; and whereas said eminent service was administered by and through Surgeon-General John B. Hamilton, of the U. S. Marine-Hospital Service, and the officers of his corps; and whereas this assistance is recognized as being of high professional order; be it

Resolved, That the house of representatives of the State of Florida do hereby tender our sincere thanks to Surgeon-General Hamilton and the officers of his corps for the able, conscientious, and faithful manner in which the duties devolving upon them were met and fulfilled; and we also recognize the wisdom and zeal displayed

*Evidently intended for Marine-Hospital Service.

in perfecting and extending measures tending to the relief of the sick, suffering, and panic-stricken of this State; be it

Further resolved, That a copy of these resolutions, properly enrolled, be forwarded to the President of the United States, the members of his Cabinet, and Surgeon-General John B. Hamilton.

Approved February 18, 1889.

EPIDEMIOLOGY.

As a contribution to epidemiology no less than as a partial record of the work done in Florida, the reports of the several officers engaged in the work is inserted in this place. The researches of Dr. Sternberg, of the Army, into the causation of yellow fever is necessarily omitted, as that officer has not completed his final report. He is now engaged in the examination of the specimens collected in Havana, and has informed me that his final report will be submitted to the President at an early day. His report on the method practiced in Mexico and Brazil for the prevention of yellow fever by inoculation is elsewhere inserted in this report.

DIAGNOSIS OF YELLOW FEVER.*

The diagnosis of yellow fever rests upon the three following cardinal symptoms: The facies, the deviation from the general law of correlation between pulse and temperature, and the albuminuria.

I was detailed as medical officer of the probation camp instituted by Surgeon-General Hamilton, of the Marine-Hospital Service, at Camp Perry, Florida, during the late epidemic. One of my duties was to examine, twice daily, the refugees coming from Jacksonville, in order to detect the first symptoms of the disease. I soon found that for purposes of an early diagnosis I had to rely exclusively upon the facies. In the great majority of cases this was sufficient, and the diagnosis was made within the first twenty-four hours of the disease; often, in fact, on the morning of the first day. A few individuals were looked upon with suspicion, even before the attacks came on, and the suspicions were verified by subsequent events, though not always. I am satisfied that the yellow fever facies may be observed sometimes before the onset of the fever.

In a few cases the diagnosis had to lay over waiting for confirmation from the other symptoms. Sometimes the discrepancy of the pulse and temperature, sometimes the albuminuria came first to remove all doubts.

The onset of yellow fever is in the majority of cases sudden; but the same may be said of the diseases with which yellow fever might be confounded. There are no subjective symptoms in the early stage constant enough to be termed characteristic, except, perhaps, that the frontal headache and the pain in the loins and limbs may be more pronounced than in other acute febrile diseases.

As a rule there is no pronounced chill. Vomiting, nose bleed, epigastric pain, burning or uneasiness, frequent spitting, catarrhal symptoms of the lower bowel, intense aching of the back and thighs, somnolence or restlessness, all these symptoms may or may not be present upon the first examination of the patient. In the majority of cases the patient gets up and dresses in the first morning after the attack.

* By John Guit  ras, Passed Assistant Surgeon, U. S. Marine-Hospital Service.

The temperature will be found to be about 103° Fah., though it may be much higher. The pulse will correspond in frequency with the heat of the body, and will show, as a rule, the tension and the volume that characterize, in the earlier stages, the febrile diseases that present a rapid invasion. The tongue will not show any peculiar sign.

Standing out conspicuously from this background common to most acute febrile diseases, we notice a striking appearance of the face. This is observed in the beginning to greater advantage at a slight distance from the patient. With the general red suffusion of the countenance, and some turgidity of the upper lip, we find a characteristic appearance of the eyes. The borders of the lids are slightly reddened, and the eye-ball is watery, injected, and somewhat yellow. The latter color furnishes the most important element of these special symptoms. Otherwise, the eye might be mistaken for the eye of typhus or of measles. It is a ferrety eye tinged with yellow. The jaundice, it will be observed, is one of the earliest manifestations of the disease.

The congestion and discoloration of the conjunctiva and sclerotic are always present, though they may be very slight in the first and second days of the disease. I have frequently noticed, on approaching the patient, that the eye appeared somewhat injected and suffused with yellow, but have been surprised to find on closer examination, by separation of the lids, that neither the congestion nor the jaundice could be demonstrated. With the advance of the disease, however, these symptoms become very apparent, unless the case be one of unusual mildness.

These symptoms are always of great value, but in children and in young people, especially women, who have not undergone exposure to the sun, I consider the eye symptoms as pathognomonic of yellow fever.

I shall mention the following circumstances that are capable of impairing the value of this important sign as a means of early diagnosis. The yellow-fever eye is seen at its best in the blue-eyed Saxon, and may be looked for in vain in the negro, at least in the early stages of the disease.

The eye symptoms are of doubtful value when they are observed by artificial yellow light.

We hesitate also in giving them great importance when we are confronted with the bloated face of the drunkard, the blear-eyed, or the eyes irritated by watching, or by dust.

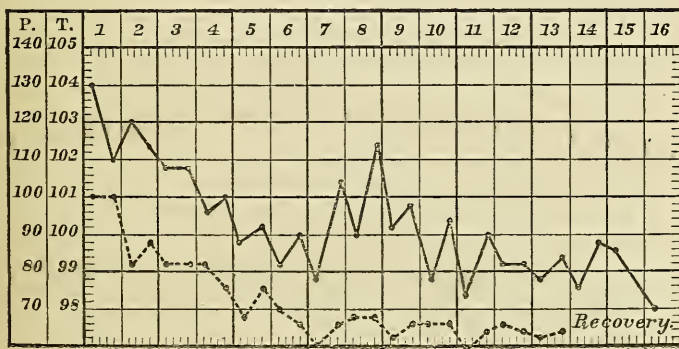
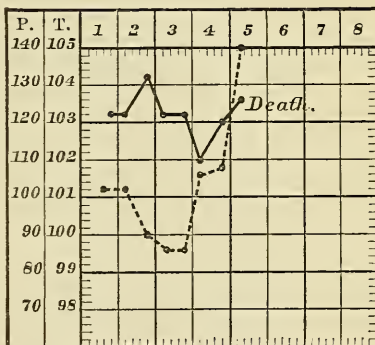
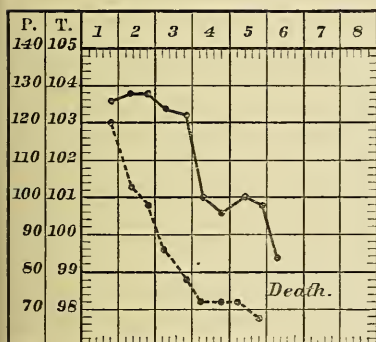
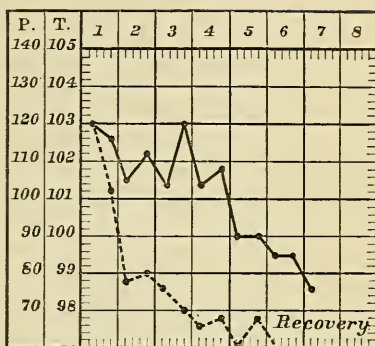
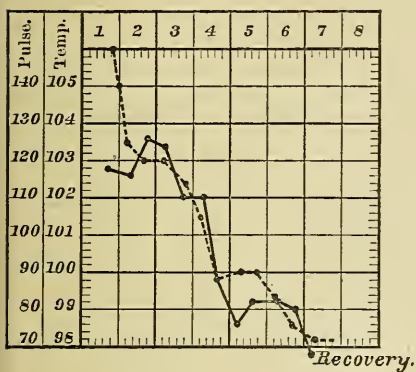
The second symptom of importance is the discrepancy between the pulse and the temperature. The duration of the fever is variable. Including both the fatal and favorable cases we find that the greater number are of six days' duration. This is shown in the following table of seventy-eight cases carefully recorded and observed by myself from the commencement of the attack:

No. of cases.	Duration.	No. of cases.	Duration.	No. of cases.	Duration.
	<i>Days.</i>		<i>Days.</i>		<i>Days.</i>
4.....	2	18.....	6	2.....	10
8.....	3	9.....	7	1.....	12
10.....	4	5.....	8	1.....	13
9.....	5	6.....	9	2.....	14

In three cases that may be added to this list the duration was still longer. Such cases I consider complicated with the continued thermic fever.

The specific characters of the pulse and temperature may be seen in the charts contributed by Dr. Faget in another part of this publication. It will be observed that the fever is characterized by a sudden invasion and a fastigium of from one to four days' duration, terminating with an irregular lysis. In severe cases the lysis is interrupted by a secondary exacerbation. In exceptionally prolonged cases there may be two or even three of these exacerbations. These assume then somewhat the character of relapses.

Examples of these different forms are given herewith:



The most characteristic and constant feature of these charts is the deviation from the normal relations of the pulse and temperature. The first to dwell upon the importance of this symptom was the elder Faget, of New Orleans.

It will be found that the pulse commences to fall during the fastigium. This may happen in the first twenty-four hours of the disease, and very often at the same time that the temperature is rising. An average of twenty-four cases gives, for the morning of the first day, a pulse of 109, and for the evening of the same day a pulse of 103. The temperatures corresponding to these averages was found to be 101.8° Fah. for the morning, and 102.6° Fah. for the evening. Quite frequently this deviation from the normal does not take place until later.

The pulse continues to fall disproportionately during the lysis, and reaches very often abnormally low figures—between 40 and 60.

It is not very rare for the temperature to remit considerably in the course of yellow fever, especially in the second and third mornings. The remission is followed by an evening exacerbation. In some cases the temperature may fall to the normal on the morning of the second day. I do not consider that this fact is sufficient to establish a malarial complication. I call it an anomaly in the course of yellow fever, because I have met with such cases where there was no possibility of a malarial complication. In my opinion malarial complications occurring in the course of yellow fever are extremely rare. The anomalous cases above referred to are most frequent during mild epidemics of yellow fever.

The third characteristic symptom is the albuminuria. The nephritis of yellow fever is remarkable for its transitory character. It appears suddenly and early in the course of the fever, and will disappear as rapidly as it came, without leaving any trace behind—no chronic albuminuria, no dropsy, no cachexia.

The albumen may present itself within twenty-four hours in rapidly fatal cases. In the average cases it will be found, if carefully looked for, often on the evening of the second day. It may not appear until the third or fourth day. The albumen may be found only once, or may persist even to the fourth week after convalescence. The amount varies from a trace to a quantity sufficient to cause complete coagulation of the fluid. The mild cases generally present very little albumen, and the opposite is true of severe cases. At the same time we can not conclude that an excess of albumen is an indication for fatal prognosis. Among the severe cases the proportion of albumen is not greater in the fatal ones. I have seen a walking case of yellow fever, terminating favorably, in which, during three days the urine became totally solid on boiling.

As to the frequency of this symptom, I find that much depends upon the method and the frequency of the examinations. As I have said before, this symptom is sometimes very transitory, and the evening urine alone will contain albumen, whilst the morning urine, which is the one generally obtained for examination, may be free. This is particularly true of children. In cases of pronounced albuminuria it will be found often that there is more albumen in the evening than in the morning urine. This may occur independently of febrile exacerbations.

I can not believe that the albuminuria of mild cases is merely functional. Because I find that the tube casts may be as transitory as the albuminuria. Furthermore, histological research shows a great variation in the extent of the areas of renal tissues involved in the inflammatory process. A fact that leads me to believe that the amount of albumen depends upon the extent of epithelium involved.

As to the doubts expressed by some concerning the frequency of albuminuria in yellow fever, I explain them by the fact that the heat and nitric acid test does not adapt itself to the emergencies and the hurry of epidemic times. Under these circumstances Heller's test should always be employed. With the exception of a few very mild cases of forty-eight hours duration, I have always found albumen in the urine of yellow fever patients.

This test, modified, is performed in the following manner: The bottom of a test tube is filled to the depth of about one-half inch with nitric acid. A filter (readily im-

provided by folding across twice a small piece of filtering paper) is held by the index finger and thumb of the left hand on the mouth of the tube. The tube is held in an inclined position in the left hand. An amount of urine, about equal to that of acid, is poured on the filter, and runs slowly down the side of the tube. By this means we obtain two superimposed layers, the lower one of nitric acid and the upper one of urine. *At the point of contact, or a little above it, a white opaque layer makes its appearance if there is albumen in the urine.* The opacity may be very slight, and it may be necessary to hold the tube in different positions, until the proper light and background are obtained to bring out the experiment.

Tube casts are often found in abundance. They are epithelial, granular, fatty, and hyaline. Blood casts are occasionally met with. In cases of very slight albuminuria we frequently fail to discover any casts. But I have not been able to give this matter the patient research that it requires.

With this conspicuous train of symptoms before us, I see no necessity for the construction of long tables of differential diagnosis. These tables contrast yellow fever with diseases, with which it should never be confounded. The real difficulty is encountered when we attempt to distinguish mild cases of yellow fever from forms of ephemeral fever.

Here we have to rely entirely upon the three symptoms that I have described in detail. And we must confess that these probably fail us sometimes. Certain it is, that many children acquire immunity against the disease as a consequence of mild attacks that are never recognized. This subject needs further study in those localities where yellow fever is endemic. Unfortunately there is, in those countries, a very general and erroneous belief that the natives never have yellow fever. I have shown elsewhere (Annual Report of the Surgeon-General of the Marine-Hospital Service, 1888, p. 73) that children are, in fact, very liable to this disease.

This brings up an important inquiry concerning the origin of epidemics of yellow fever. It is very probable that the disease may be introduced into communities by mild, unrecognized cases of children and negroes.* But as I am at present concerned in the subject of diagnosis alone, I shall discuss here the bearing that our knowledge of infantile yellow fever may have on the recognition of epidemics of this disease.

I have found such knowledge of invaluable aid whenever it has been impossible to make a house to house inspection of a city. The infantile mortality may show the existence of yellow fever before any cases are diagnosed in the adult. This is true when yellow fever is introduced in a community late in the fall, and does not spread extensively. A few unrecognized cases of adults may occur during the winter months. At the same time, and during the spring, there will be an increase of the number of deaths of *white children*. Congestion, convulsions, dentition, meningitis, and above all a variety of malarial affections, will account, in the death records, for the increased death-rate.

When the epidemic is newly imported, in the middle of the summer, it is very apt to show itself first among adults, and in the commercial portions of the city. Here the disease has been imported by the shipping or in merchandise.

I have endeavored to point out the elements of diagnosis that are of value in the really doubtful cases. A full description of the disease may be found in the many valuable monographs that have been written on this subject.

TREATMENT.

Without attempting to discuss the theories of treatment advanced by Dr. Fagét in another portion of this publication, I find very little to add to the valuable instructions there given.

* The etiological questions here referred to have been discussed in my paper above quoted, and in the article on yellow fever written for Keating's Encyclopedia of the Diseases of Children.

Something, however, may be said of the popular treatment of yellow fever. This consists of active purgation and diaphoresis. The latter is induced by hot baths, mustard, and blankets. This treatment was in vogue many years ago for all acute febrile diseases, and there is no reason why it should be maintained in connection with yellow fever.

There is one very unfortunate feature that attends the popular notion of the great importance of this treatment. The general belief is that something, and something very important must be done at once. The disease must be taken in hand from the start. The patient, who can not procure at once a yellow fever doctor and a yellow fever nurse, counts with terror the valuable moments that are lost, and he certainly derives no benefit from this anxiety.

The truth is that in the majority of cases there is no indication for treatment in the first days of the disease. The cases so successfully treated at Camp Perry by the plan described in Dr. Fagét's contribution to this volume, received no medical treatment whatever in the first and second days of the disease. If they suffered much pain some Dover powder or antipyrine were given for the relief of this symptom.

During the last epidemic the bichloride of mercury has been extensively used. The drug has been recommended by Drs. Sternberg and Gibier, who are inclined to believe that the microbe of yellow fever invades the gastro-intestinal contents, and that it may be attacked there by the germicide. The results obtained by this treatment have not been better than those obtained by a symptomatic treatment. The advocates of this plan of treatment maintain, it must be stated, that its success depends upon an early administration of the drug.

The practitioners who employed the bichloride report that it had a favorable effect upon the albuminuria. In my own experience I have found that calomel has a very decided action on the renal secretion in this fever. I first used it as a diuretic in yellow fever during the epidemic of 1837 in Key West. I believe that no treatment is as successful for the complication of suppression of urine. The calomel and jalap of the Philadelphia physicians of former epidemics should be highly recommended for this particular purpose; but not in the doses that were then employed. Three doses of ij or iij grains of calomel, with iij grains of compound jalap powder every three or four hours, are sufficient. I generally continue to give the compound jalap powder without the calomel in small doses so as not to produce griping or diarrhœa. These drugs, when given in capsules, are retained by the stomach. They appear, in fact, to allay vomiting.

TREATMENT OF YELLOW FEVER.*

U. S. MARINE-HOSPITAL SERVICE,

DISTRICT OF THE GULF,

Camp Perry Hospital, Surgeon's Office, November —, 1888.

SIR: I respectfully submit this, my report of observations taken at the hospital of Camp Perry, Florida, during the prevalence of the epidemic of yellow fever in Florida in 1888.

To properly understand this paper, it must be remembered that the yellow fever hospital was distant from the camp proper about a half mile, and strict quarantine was observed. All persons detained in camp were subjected to inspection each morning and afternoon, and when the medical officer was of opinion that any person was suffering from yellow fever he was promptly sent to hospital. Dr. Guitéras, therefore, usually made the preliminary diagnostic observations.

* By C. Fagét, M. D., of New Orleans.

The Camp Perry quarantine camp was opened on the 20th of August. The fever-hospital camp was established on September 3, about half a mile from the main camp. During that interval two cases of yellow fever developed among the refugees from Jacksonville (Mr. Pollard, about twenty-five years, and Mr. Pierson, about twenty-two years of age, both Englishmen). As there were at that time no hospital tent or proper accommodations to treat them at the camp, they were returned to Jacksonville, where the cases terminated fatally, as it was learned subsequently.

On September 3, Dr. Julius Wise, acting assistant surgeon Marine-Hospital Service, took charge of the hospital and remained in charge until the 16th. I took charge on the 16th. From the 3d to the 16th there had been six cases admitted in the hospital, one death, three discharged, two remaining in the hospital. From the 16th of September to the 24th of November, at the close of the hospital, I had thirty-one cases, including the two remaining when I took charge of the hospital. E. Dombroch, discharged September 21, and Mrs. Bush, after a long and severe illness, discharged October 16. Of these thirty-one cases, two died and twenty-nine were discharged.

Total from the 3d of September to the 24th of November: Thirty-five cases of yellow fever were admitted and treated in the fever camp, three died, thirty-two were discharged. Besides, three cases of intermittent fever were treated in the hospital camp, which are not included in the above numbers—the cases of one nurse and one employé of the hospital camp, and that of a colored nurse removed from the main camp to the hospital for better accommodations. All recovered. As parents of the sick three mothers, a father, two babies, and three children were admitted as guests at the hospital camp. None of the eight contracted the disease, although none had ever had it. Moreover, none of the employés took the disease, although five had never had it. The employés of the hospital camp were: three male nurses, J. Maura, Dave Neavel, and George Balco, one female nurse, Maria Clemence, a cook, — Grant, a washerwoman, Jane Boran, and one carpenter, — Hunter. As circumstances required, two more carpenters were engaged for a short period, and two female nurses, Mrs. E. M. Laborde, for six days, and Celia Flourmay, for seven days.

When I took charge, the hospital consisted of one hospital tent and eleven small tents for physician, employés, and stores, and a building in process of construction. When it was finished, on September 19, the patients were removed to it from the hospital tent. They felt more comfortable for the change, especially a lady who had only been separated from the men by a curtain of blankets dividing the tent in two compartments.

The building, 32 by 12 feet, was divided into three rooms, respectively 10, 14, and 8 feet. Later was added another house, 10 by 20 feet, divided into a kitchen provided with a large stove, a store-room, and the doctor's office and room. Another hospital tent being added, the hospital consisted of two frame buildings, two hospital tents, and twelve small tents: four for nurses, three for employés, two for convalescents, one for storage, another as drug store, and one as "dead-house." One of the hospital tents was used as dining room for employés, convalescents, and parents of the sick. Before it was obtained, meals were taken in the open air, sometimes in the rain. Before procuring a cook the meals were carried over from the other camp.

The tents and buildings were arranged in a double crescent shape, an avenue in the middle, which presented a beautiful picture in the woods.

Dr. J. Guitéras, medical officer of Camp Perry, made the rounds of the refugee camp twice a day, examining every one, and as soon as he diagnosed a case of yellow fever, the patient was removed to the fever-hospital camp.

Thirteen arrived at the camp already sick: five from Jacksonville (among others Mrs. Crowell, died two days after, having had black vomit on arriving at Camp Perry, before being removed to the hospital), six from Callahan, and two from Up-

tonville, who were sent from these places for better accommodations at the hospital and to prevent the spread of the disease at these places.

Five were taken sick the first day of admission at Camp Perry (among others, Mrs. Simmons, who died, had come with her sick husband from Uptonville); five the second day of admission; two the third day; three the fourth; two the fifth; one the sixth; one the seventh; one the eighth; one the thirteenth day. This last one was Christina Herr, eight years old, then in Camp Perry because a brother and two of her sisters were still under treatment at the hospital. Another sister had four days of fever at Edgewood, 4 miles from Jacksonville, whence the family started on October 2, passing through Jacksonville, on their way to Camp Perry, where they arrived in the afternoon of the same day. This young lady had been exposed several times in Jacksonville, the last a week before she developed the disease at Edgewood, the first case in the family, four of whom were treated in the hospital.

From the 3d of September to the 13th of November the names, the dates of admission, deaths, and discharges of the thirty-five cases of yellow fever are as follows:

Name.	Age.	Admission to Camp Perry.	Taken sick.	Admission in hospital.	Discharged.	Died.
Mrs. McKee	28	Aug. 29	Sept. 3	Sept. 3	Sept. 14	Sept. 9, 11 p. m.
Rand. Fell	17	Aug. 29	Sept. 3	Sept. 4	Sept. 14	
W. H. Jennings	55	Sept. 1	Sept. 5	Sept. 6	Sept. 14	
Mrs. Marg. Bush	19	Aug. 28	Sept. 5	Sept. 6	Oct. 16	
Chester G. Swift	14	Sept. 6	Sept. 7	Sept. 8	Sept. 14	
Ern. Dombroch	24	Sept. 8	Sept. 10	Sept. 10	Sept. 21	
F. Villano	7	Sept. 13	Sept. 16	Sept. 16	Sept. 22	
Edw. Painter	35	Sept. 17	On cars*	Sept. 18	Oct. 1	
Dr. J. S. Posey	35	Sept. 10†	Sept. 14	Sept. 17	Sept. 26	
Edwin Yannold	37	Sept. 18	Sept. 18†	Sept. 21	Oct. 6	
Mrs. Macroon, with nine weeks' baby	21	Sept. 17	Sept. 19	Sept. 22	Sept. 28	Nov. 5. Nov. 1.
J. J. Lang	25	Sept. 22	Sept. 23	Sept. 24	Sept. 26	
E. T. Chavous	30	Sept. 19	Sept. 25	Sept. 27	Oct. 14	
Blanche Tyler	5	Sept. 25	Sept. 27	Sept. 29	Oct. 1	
J. H. Parker	19	Sept. 29	Sept. 28†	Oct. 1	Oct. 6	
J. H. Parker (readmitted)	19		Oct. 8	Oct. 9	Oct. 14	
Hon. Wanlin	48	Sept. 26	Uncertain	Sept. 27	Oct. 15	
William Herr	18	Oct. 2	Oct. 6	Oct. 7	Oct. 27	
Laura Herr	16	Oct. 2	Oct. 5	Oct. 7	Oct. 16	
Lucise Herr	12	Oct. 2	Oct. 6	Oct. 8	Oct. 23	
Christina Herr	8	Oct. 2	Oct. 15	Oct. 16	Oct. 23	Nov. 5. Nov. 1.
R. E. Matthews	18	Oct. 15	Oct. 13†	Oct. 15	Oct. 23	
Augt. Blum	17	Oct. 13	Oct. 14	Oct. 16	Oct. 25	
N. McCallion	50	Oct. 11	Oct. 18	Oct. 19	Oct. 29	
E. Burritt	41	Oct. 20	Oct. 19†	Oct. 21	Oct. 29	
Madis. Duck (col.)	60	Oct. 16	Oct. 16†	Oct. 21	Oct. 30	
Ben. Upton	56	Oct. 26	Oct. 22§	Oct. 26	Nov. 2	
J. Simmons	29	Oct. 27	Oct. 26||	Oct. 27	Nov. 5	
Mrs. Simmons	28	Oct. 27	Oct. 28	Oct. 30	Nov. 5	
Mrs. Crowell	37	Oct. 29	Oct. 28†	Oct. 29	Nov. 5	
W. W. Rawson	32	Oct. 30	Oct. 26†	Oct. 30	Nov. 5	Nov. 5. Nov. 1.
F. Siera	22	Oct. 28	Oct. 31	Nov. 1	Nov. 4	
Hubbard, conductor	27	Nov. 4†	Nov. 5	Nov. 6	Nov. 10	
J. German (col.)	30	Nov. 9	Nov. 5	Nov. 9	Nov. 13	
Wash. Lafton (col.)	26	Nov. 9	Nov. 7	Nov. 9	Nov. 13	
Isaac Barber (double attack)	27	Nov. 13	Nov. 13	Nov. 13	Nov. 24	

* Arrived from McClenny.

† In Jacksonville.

‡ In Callaban.

§ In Uptonville, about date named.

|| In Uptonville.

* From Jacksonville.

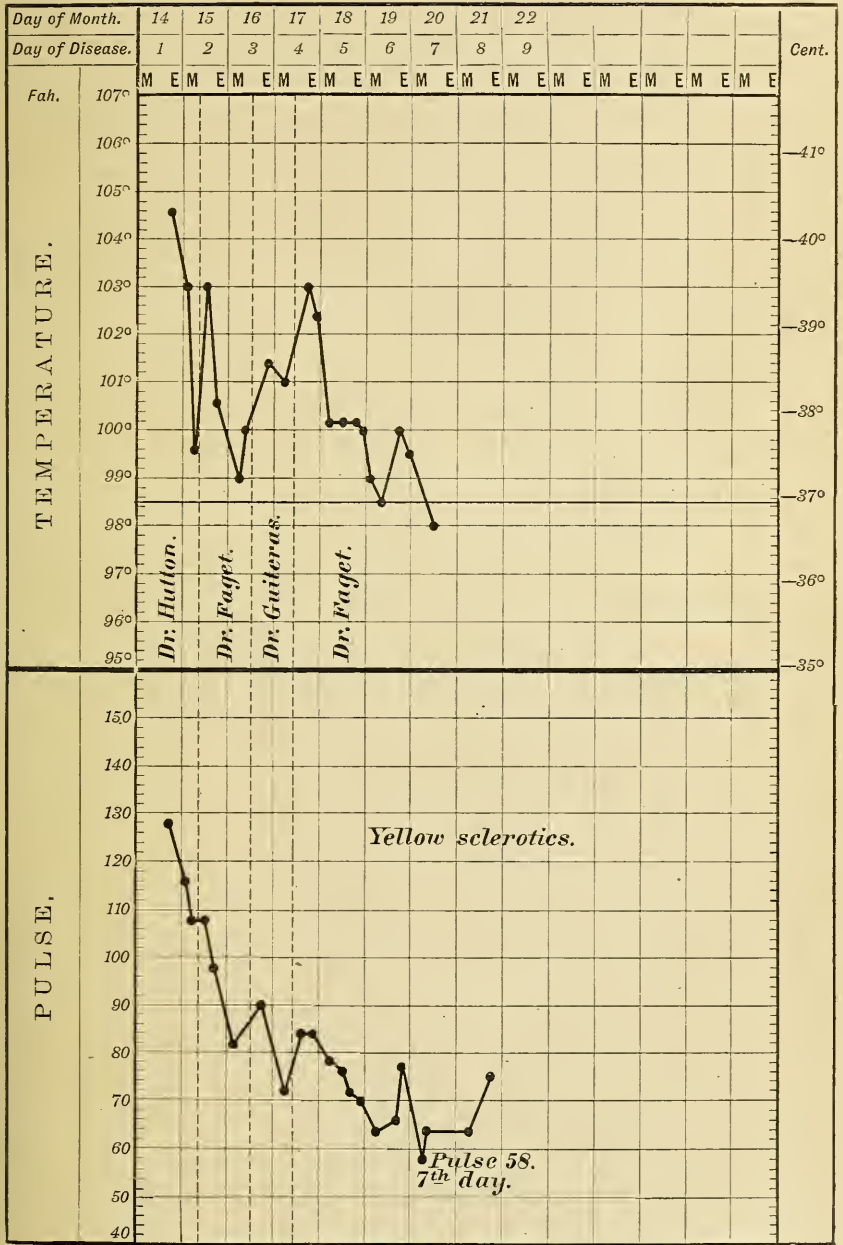
OBSERVATIONS.

Case No. 1.

Dr. J. L. Posey; thirty-five years; had been exposed in 1878 at Washington, La., where yellow fever was epidemic, and at the hospital of New Orleans in 1874 without contracting the disease; was taken sick at 9 p. m. September 14 at Camp Perry, four days after arrival and five days after having been exposed at McClenny, where

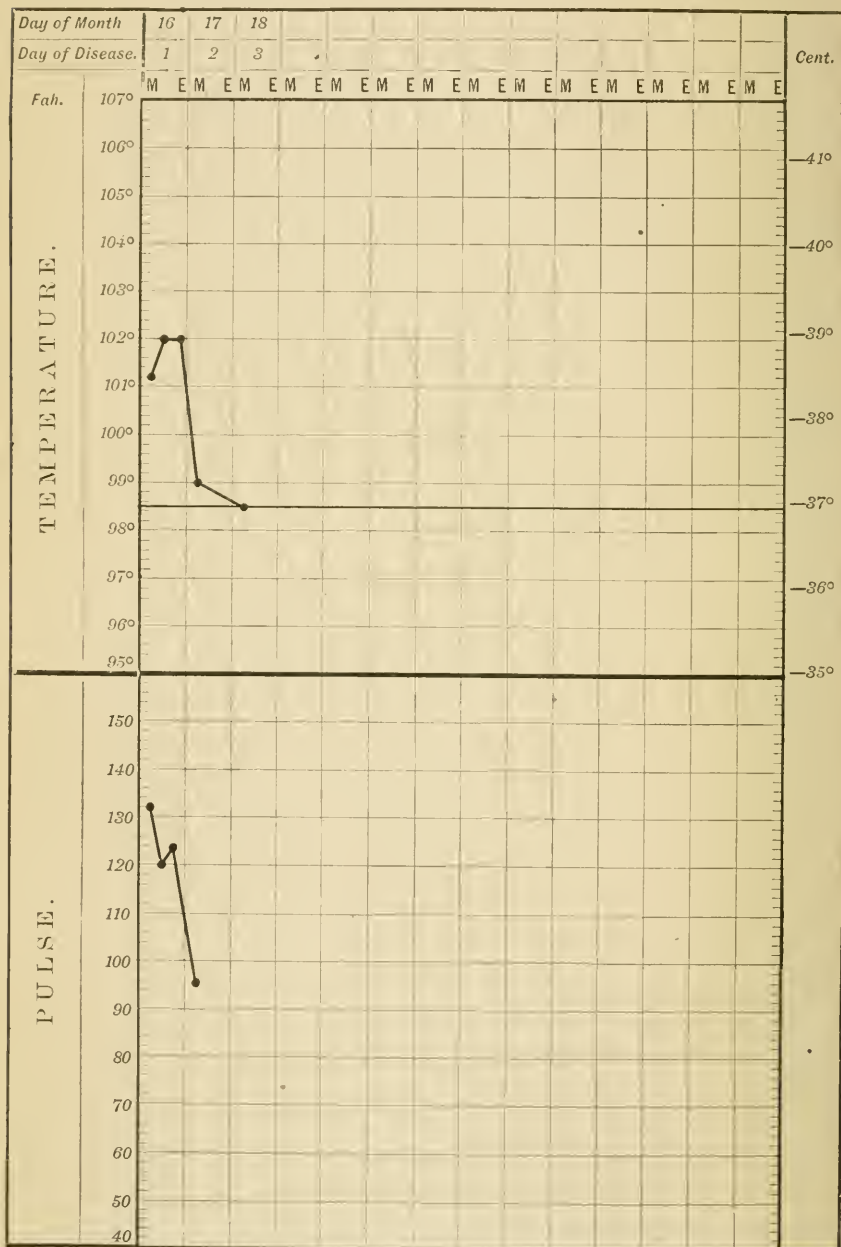
Camp Perry Hospital, epidemic of 1888 in Florida—Clinical chart of temperature and pulse.

CASE No. 1.—Dr. J. L. Posey, 35 years; arrived from McClenny to Camp Perry September 11; taken sick at 9 p.m. September 14; yellow fever; admitted in Camp Perry Hospital September 17; discharged September 26.



Camp Perry Hospital, epidemic of 1888 in Florida—Clinical chart, etc.—Continued.

CASE No. 2.—Frank Villars, 7 years; arrived at Camp Perry from Jacksonville September 13; taken sick September 16; yellow fever; admitted to hospital September 16, at 1 a. m.; discharged September 21.



Camp Perry Hospital, epidemic of 1888 in Florida—Clinical chart, etc.—Continued.

CASE No. 3.—Costanza Farilla Villans, mother of F. Villans; taken sick September 14, at night; yellow fever; convalescent September 17.



he had been engaged as Government inspector, where yellow fever was epidemic at the time.

Observations taken by—	Date	Day.	Hour.	Pulse.	Temperature.	Remarks.
Dr. Hutton ...	Sept. 14	First	11 p. m.	128	104 $\frac{3}{4}$	
	15	Second	2 a. m.	116	103	
	15	do	6 a. m.	108	99 $\frac{3}{4}$	
Dr. Fagét* ...	15	do	12 m.	108	103	
	15	do	4 p. m.	98	100 $\frac{3}{4}$	
	16	Third	10 a. m.	81	99	
	16	do	1 p. m.	.....	100	
Dr. Guitéras...	16	do	6 p. m.	90	101 $\frac{1}{2}$	
Dr. Fagét.....	17	Fourth	6 a. m.	72	101	Admitted to hospital.
	17	do	2 p. m.	84	103	
	17	do	9 p. m.	84	102 $\frac{1}{4}$	Eyes yellow and congested.
	18	Fifth	6 a. m.	78	100 $\frac{1}{2}$	Tenderness in epigastric region.
	18	do	9 $\frac{1}{2}$ a. m.	76	100 $\frac{1}{2}$	
	18	do	3 p. m.	72	100 $\frac{1}{2}$	Vomiting.
	18	do	9 p. m.	70	100	Albumen in urine.
	19	Sixth	4 a. m.	.....	99	Great prostration.
	19	do	8 a. m.	64	98 $\frac{1}{2}$	
	19	do	1 $\frac{1}{2}$ p. m.	66	100	
	19	do	7 p. m.	76	92 $\frac{1}{2}$	
	20	Seventh	7 a. m.	58	.....	No fever hence.
	20	do	10 a. m.	64	98	
	21	Eighth	7 a. m.	64	.....	
	22	Ninth	9 a. m.	76	.....	Yellow sclerotics.

*Arriving at Camp Perry September 15.

Convalescent. Discharged September 26.

NOTE.—I would call attention to the fall of the temperature to 99 $\frac{3}{4}$ and 99 the mornings of the 15th and 16th, which striking remissions do not belong to the course of typical yellow fever and which may be ascribed to a malarial complication. The pulse, however, shows a regular decrease from the first day, not rising with the paroxysms.

Case No. 2.

Frank Villano; seven years; admitted in Camp Perry September 13, from Jacksonville, with his father, mother, and baby; taken sick September 16 at 1 a. m.; admitted in hospital in the morning.

Observations taken by—	Date.	Day.	Hour.	Pulse.	Temperature.	Remarks.
Dr. Fagét	Sept. 16	First	8 a. m.	132	101 $\frac{1}{2}$	
	16	do	12 m.	120	102	
	16	do	3 p. m.	124	102	
	17	Second	6 $\frac{1}{2}$ a. m.	96	99	
	17	do	6 p. m.	.....	.....	No fever.

Discharged September 21. Very light case.

Note the rise of temperature with fall of pulse between the first two observations.

Case No. 3.

Costanza Farilla; thirty-one years; mother of Frank Villano; taken sick in Camp Perry night of September 14; was not removed to hospital.

Observations taken by—	Date.	Day.	Hour.	Pulse.	Temperature.	Remarks.
Dr. Hutton	Sept. 15	First	9 a. m.	.....	100 $\frac{1}{2}$	
Dr. Fagét	15	do	4 $\frac{1}{2}$ p. m.	98	102	
	16	Second	8 a. m.	76	100	
	16	do	9 a. m.	84	100 $\frac{3}{4}$	
Dr. Guitéras...	16	do	6 p. m.	84	102 $\frac{3}{4}$	
	17	Third	6 a. m.	74	101 $\frac{1}{2}$	

Case No. 4.

Ernest DombrockrGerman; twenty-four years; admitted in Camp Perry, from Jacksonville, September 8; taken sick at Camp Perry September 10, 6 p. m.; intense pain in forehead and back; removed to hospital same day.

Observations taken by—	Date.	Day.	Hour.	Pulse.	Temperature.	Remarks.
Drs. J. Wise and Guitéras.	Sept. 10	First	6 p. m.	110	102 $\frac{1}{2}$	No observations.
	11	Second	11 a. m.	86	103	
	12	Third	11 p. m.	74	102	
	13	Fourth	a. m.	72	100 $\frac{1}{2}$	
	14	Fifth				
Dr. Fagét.....	15	Sixth		66	98 $\frac{1}{2}$	No fever. Yellow sclerotics. Weakness.
	16	Seventh	Noon	52	98	
	16	do	6 p. m.	48		
	17	Eighth	6 a. m.	48		
	18	Ninth	6 a. m.	50		
	21	Twelfth		62		

Discharged September 21.

NOTE.—Typical case; rise of temperature with fall of pulse.

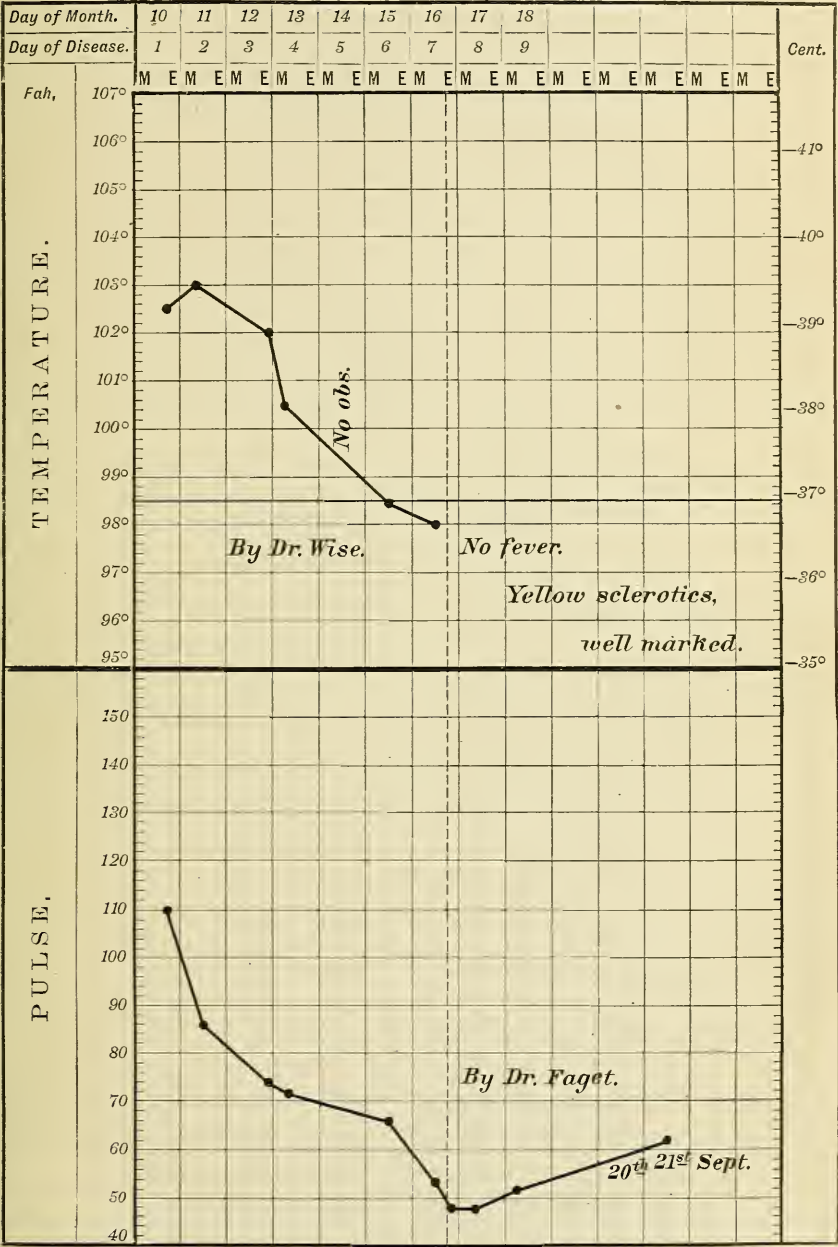
Case No. 5.

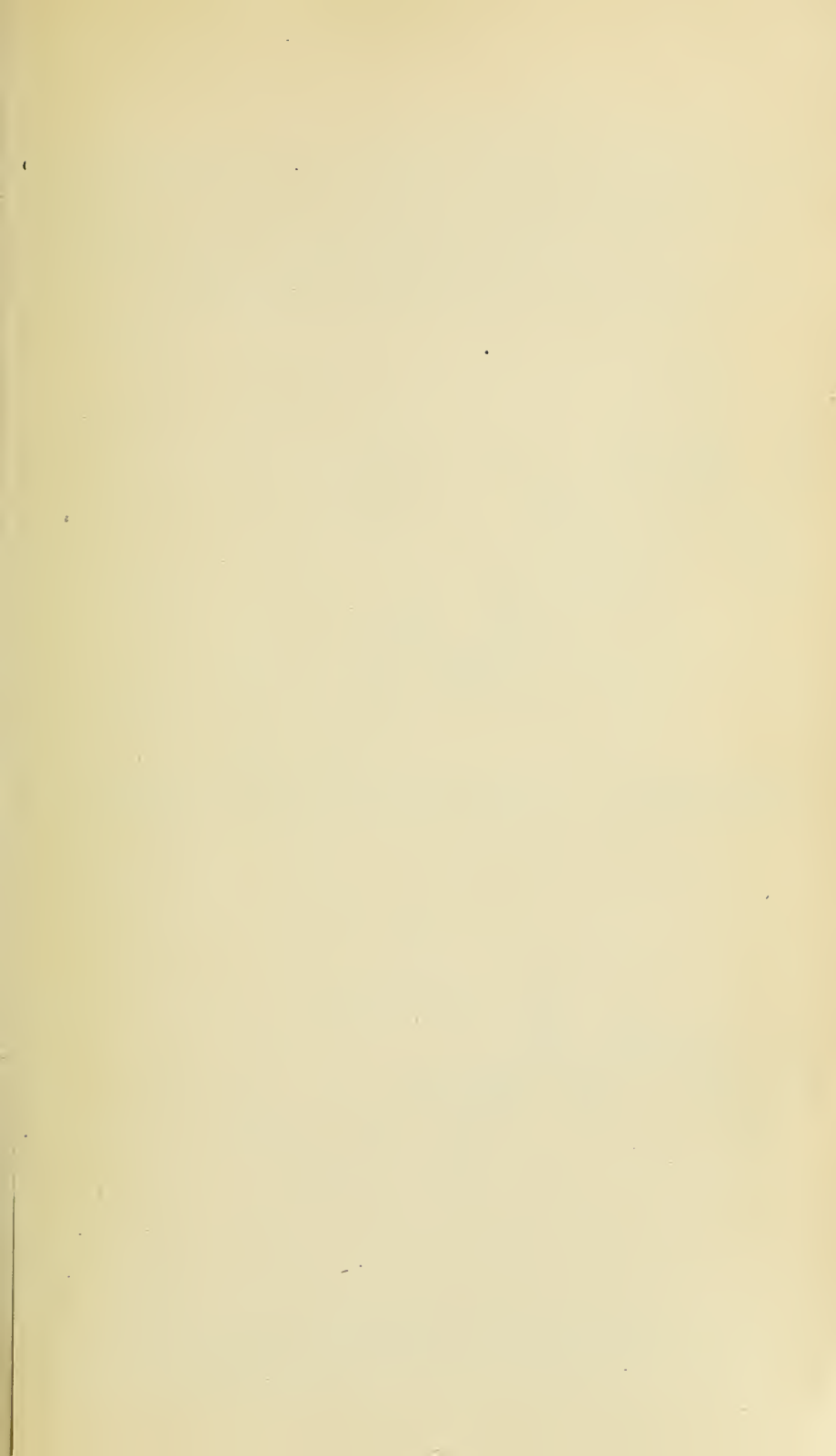
Mrs. Margaret Bush; nineteen years; born in New York; married; admitted in Camp Perry, from Jacksonville, August 28; taken sick September 5, 3 p. m.; slight chill, severe headache, nervous attack two hours before admission in hospital, September 6.

Observations taken by—	Date.	Day.	Hour.	Pulse.	Temperature.	Remarks.
Dr. Wise.....	Sept. 6	Second	11 a. m.	120	103	Pulse irregular.
	7	Third	a. m.	90	102	
	7	do	p. m.	108	103	
	8	Fourth		110	102	
	9	do	a. m.	110	102	
	9	do	p. m.	118	103 $\frac{1}{2}$	
	10	Fifth	8 a. m.	110	102	
	10	do	6 p. m.	120	104	
	11	Sixth	a. m.	114	103	
	12	Seventh	a. m.	120	103	
	12	do	p. m.	118		
	13	Eighth	a. m.	100	103	
	13	do	p. m.	100	103 $\frac{1}{2}$	
	14	Ninth	a. m.	104	103	
	15	Tenth	a. m.	104	102	
Dr. Fagét.....	15	do	p. m.	104	104	Antipyrin, 10 grains. Quinine, 20 grains.
	16	Twelfth	12 m.	112	103	
	16	do	3 p. m.	116	104	
			6 p. m.	112	104 $\frac{1}{2}$	
			9 $\frac{1}{2}$ p. m.	108	103 $\frac{1}{2}$	
	17	Thirteenth	6 $\frac{1}{2}$ p. m.	108	103 $\frac{1}{2}$	
	17	do	12 m.		103 $\frac{1}{2}$	
	17	do	2 p. m.	108	103	
	17	do	9 p. m.	96	102 $\frac{1}{2}$	
	18	Fourteenth	7 a. m.	96	101 $\frac{1}{2}$	
	18	do	9 $\frac{1}{2}$ a. m.	96	101 $\frac{1}{2}$	
	18	do	3 p. m.		101	
	18	do	8 p. m.	100	101	
	19	Fifteenth	7 a. m.	82	99	
	19	do	10 a. m.	82	100	
	19	do	3 $\frac{1}{2}$ p. m.		102 $\frac{1}{2}$	
	20	Sixteenth	7 a. m.	100	102 $\frac{1}{2}$	Antipyrin, 15 grains. Do.
	20	do	10 a. m.	108	103 $\frac{1}{2}$	
	20	do	1 p. m.	112	104	
	20	do	2 p. m.	96	101 $\frac{1}{2}$	
	20	do	6 p. m.	108	104	
	20	do	9 p. m.	96	101 $\frac{1}{2}$	
	21	Seventeenth	7 a. m.	90	100 $\frac{1}{2}$	
	21	do	10 a. m.		101 $\frac{1}{2}$	

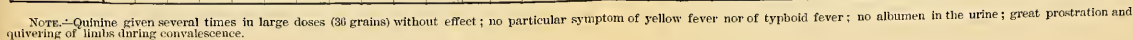
Camp Perry Hospital, epidemic of 1888 in Florida—Clinical chart, etc.—Continued.

CASE No. 4.—Ernest Dombrock, 24 years; left Jacksonville September 8; September 10, intense pain in head and back; taken sick at Camp Perry September 10, 6 p. m.; discharged September 21.



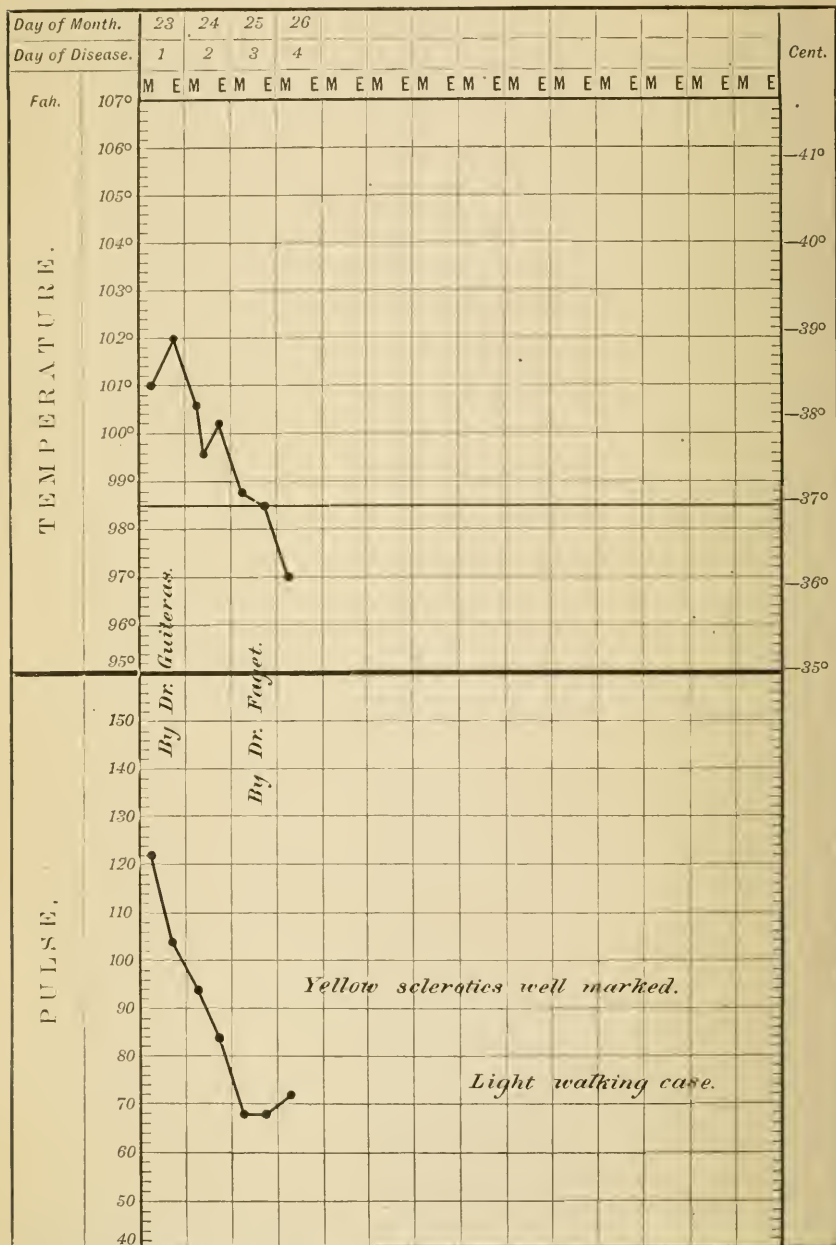


CASE No. 5.—Mrs. Margaret Bush, 19 years; left Jacksonville August 28; taken sick in Camp Perry September 5, 3 p. m. (7 days in camp); admitted in hospital September 6, 11 a. m.; yellow fever (typhoid form); no typhoid symptoms; discharged October 16.



Camp Perry Hospital, epidemic of 1888 in Florida—Clinical chart, etc.—Continued.

CASE No. 6.—J. J. Lang, 20 years; arrived in Jacksonville September 21; left Jacksonville for Camp Perry September 22; taken sick September 23, a. m.; yellow fever (a light case); admitted in hospital September 24, 8 a. m.; discharged September 26.



Observations taken by—	Date.	Day.	Hour.	Pulse.	Temperature.	Remarks.
Dr. Fagét.....	Sept. 21	Seventeenth	12 m.	-----	100½	
	21	do	3 p. m.	108	102½	
	21	do	9 p. m.	96	102	
	22	Eighteenth	7 a. m.	84	100½	
	22	do	12 m.	-----	103½	
	22	do	3½ p. m.	104	104	Antipyrin.
	22	do	6 p. m.	96	101½	
	22	do	10 p. m.	106	103	
	23	Nineteenth	7 a. m.	100	102½	Transferred from hospital tent to building.
	23	do	10 a. m.	118	103¾	
	23	do	4 p. m.	112	103½	
	23	do	8 p. m.	-----	-----	Less fever, Fowler's solution begun.
	24	Twentieth	6 a. m.	104	102	
	24	do	10 a. m.	104	100	
	24	do	2 p. m.	108	103	
	24	do	5 p. m.	106	103	
	25	Twenty-first	6½ a. m.	90	100½	
	25	do	1 p. m.	108	100½	
	25	do	6 p. m.	100	102	
	26	Twenty-second	6 a. m.	90	99½	
	26	do	2 p. m.	120	101½	
	26	do	5½ p. m.	124	102½	
	26	do	7½ p. m.	108	102½	
	27	Twenty-third	7 a. m.	100	99½	
	27	do	10½ a. m.	104	99½	
	27	do	3 p. m.	94	99½	
	27	do	5½ p. m.	98	99½	
	27	do	7 p. m.	-----	100	
	28	Twenty-fourth	7 a. m.	88	98	
	28	do	3 p. m.	104	98	
	28	do	7½ p. m.	88	98½	Sitting up.
	29	Twenty-fifth	7 a. m.	74	98½	
	29	do	11 a. m.	96	98	
	29	do	4 p. m.	100	99½	
	29	do	7 p. m.	100	99½	
	30	Twenty-sixth	8 a. m.	-----	98¾	Great prostration.
	30	do	7 p. m.	-----	99½	
	Oct. 1	Twenty-seventh	-----	80	96½	
	2	Twenty-eighth	-----	76	-----	
	10	Thirty-sixth	-----	92	-----	Laughing, walking about.

Discharged October 16. No particular symptom of yellow fever, nor of typhoid fever; no tenderness, no pain, in any parts of the body, no albumen in the urine. Quivering of the limbs during convalescence. Large doses of quinine given several times without appreciable effect.

Case No. 6 (very light case).

J. J. Lang; twenty-five years; admitted in Camp Perry September 22, from Jacksonville, where he had been twenty-four hours, arriving there September 21, from Kentucky; taken sick at Camp Perry September 23, in the morning.

Observations taken by—	Date.	Day.	Hour.	Pulse.	Temperature.	Remarks.
Dr. Guitéras ..	Sept. 23	First	a. m.	122	101	
	23	do	p. m.	104	102	
Dr. Fagét.....	24	Second	a. m.	93	100¾	
	24	do	8 a. m.	-----	99¾	
	24	do	3 p. m.	84	100½	
	25	Third	7 a. m.	68	98½	
	25	do	4 p. m.	68	98½	
	26	Fourth	6 a. m.	72	97	

Discharged September 26. The eyes and complexion are characteristic. Note the rise of temperature with fall of pulse between first and second observations.

Case No. 7.

Edward Painter; thirty-five years; Englishman; three years in Jacksonville. Left Jacksonville and admitted in Camp Perry September 17, 4 p. m.; taken sick on the cars; severe headache and pain in the joints.

Observations taken by—	Date.	Day.	Hour.	Pulse.	Temperature.	Remarks.
Dr. Fagét	Sept. 17	First	7 p. m.	117	103 $\frac{3}{4}$	
	18	Second	a. m.	93	101 $\frac{1}{2}$	
	18	do	4 $\frac{1}{2}$ p. m.	84	102	
	18	do	8 p. m.	78	101 $\frac{3}{4}$	
	19	Third	7 a. m.	61	99 $\frac{1}{2}$	
	19	do	10 a. m.	60	99	
	19	do	3 p. m.	88	101	
	19	do	7 p. m.	88	102	
	20	Fourth	7 $\frac{1}{2}$ a. m.	78	100	
	20	do	2 p. m.	78	101	
	20	do	5 p. m.	78	102	
	20	do	9 p. m.	78	101 $\frac{1}{2}$	
	21	Fifth	7 a. m.	68	100	
	21	do	10 a. m.	68	99 $\frac{1}{2}$	
	21	do	12 m.	68	99 $\frac{1}{2}$	
	21	do	3 p. m.	76	100 $\frac{1}{2}$	
	21	do	5 p. m.	76	100 $\frac{1}{2}$	
	21	do	9 p. m.	72	100 $\frac{1}{2}$	
	22	Sixth	8 a. m.	72	100 $\frac{1}{2}$	
	22	do	3 $\frac{1}{2}$ p. m.	72	100 $\frac{1}{2}$	
	22	do	6 $\frac{1}{2}$ p. m.	64	100	
	23	Seventh	7 $\frac{1}{2}$ a. m.	60	98 $\frac{1}{2}$	
	23	do	4 p. m.	62	97 $\frac{1}{2}$	

Discharged fourteenth day, October 1. Recuperating slowly during convalescence. The eyes and complexion are characteristic.

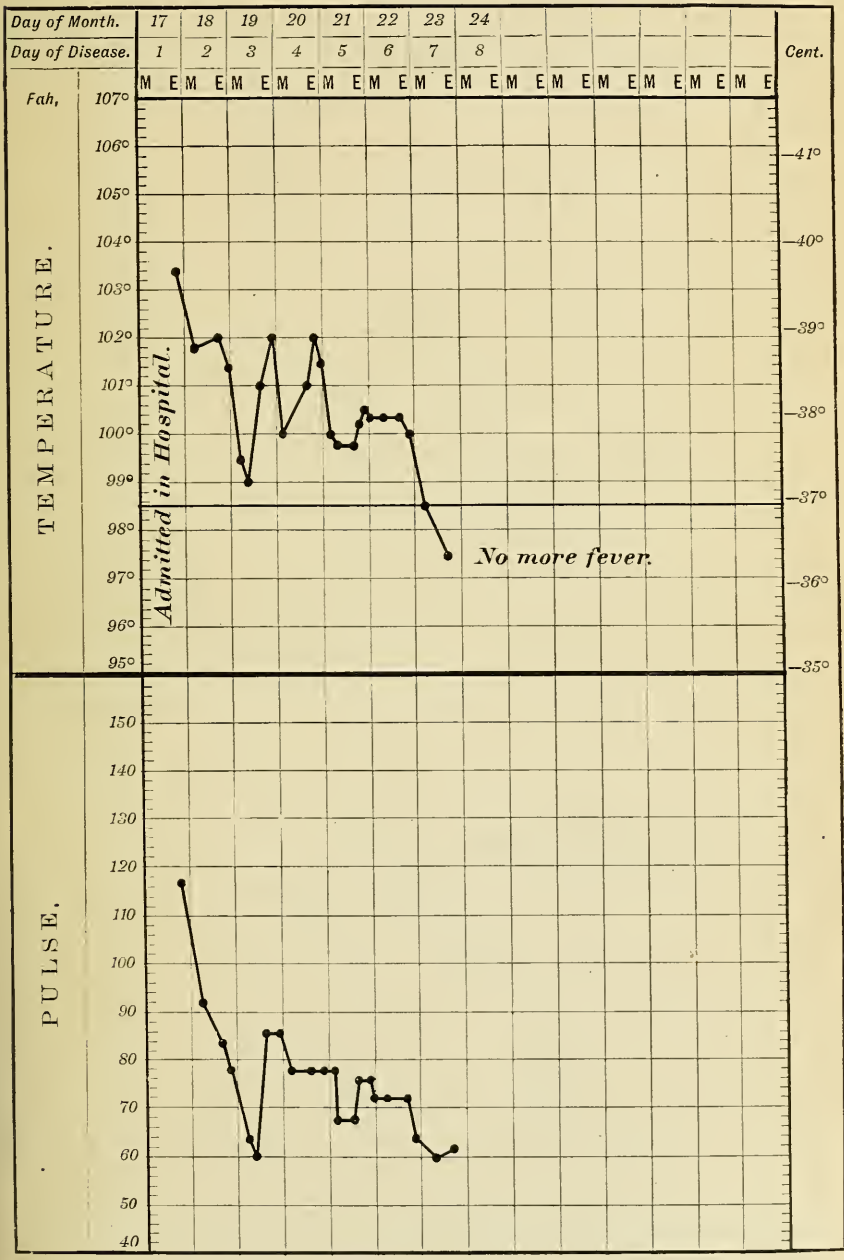
Case No. 8.

Edwin Yarnold; thirty-seven years; Englishman; druggist, of Jacksonville. Left Jacksonville and admitted in Camp Perry September 18, at 4 p. m. Taken sick in Jacksonville same day (September 18), 1 p. m.; had high fever during night of his arrival; had great distress in stomach and diarrhea since, and subsequent dysentery; removed to hospital September 21.

Observations taken by—	Date.	Day.	Hour.	Pulse.	Temperature.	Remarks.
Dr. Fagét	Sept 18	First	p. m.	132	102 $\frac{3}{4}$	
	19	Second	a. m.	99 $\frac{3}{4}$	99 $\frac{3}{4}$	Fever.
	19	do	p. m.	93	101	
	20	Third	a. m.	84	101	
	20	do	p. m.	96	102 $\frac{1}{4}$	
	21	Fourth	a. m.	104	103 $\frac{1}{4}$	
	21	do	12 m.	104	103 $\frac{1}{4}$	
	21	do	3 p. m.	104	103 $\frac{1}{4}$	Dysentery.
	21	do	7 p. m.	104	103 $\frac{1}{4}$	
	21	do	9 p. m.	98	102	
	22	Fifth	8 a. m.	94	100	Very sick.
	22	do	10 a. m.	100	101	
	22	do	3 $\frac{1}{2}$ p. m.	116	98	
	22	do	6 $\frac{1}{2}$ p. m.	92	99 $\frac{1}{4}$	No fever.
	22	do	10 p. m.	86	100	
	23	Sixth	7 a. m.	86	100	
	23	do	10 a. m.	92	101 $\frac{1}{4}$	Feelings of prostration and sinking.
	23	do	5 p. m.	100	101 $\frac{1}{4}$	
	23	do	7 p. m.	112	101 $\frac{1}{4}$	
	24	Seventh	6 a. m.	100	100 $\frac{1}{2}$	
	24	do	10 a. m.	104	101 $\frac{1}{4}$	
	24	do	6 p. m.	108	101 $\frac{1}{4}$	Large quantities of blood mixed with stools, which are very frequent.
	25	Eighth	5 $\frac{1}{2}$ a. m.	96	100 $\frac{1}{4}$	
	25	do	6 $\frac{1}{2}$ a. m.	88	97 $\frac{1}{4}$	
	25	do	2 p. m.	104	99 $\frac{1}{4}$	
	25	do	5 $\frac{1}{2}$ p. m.	104	100 $\frac{1}{4}$	
	26	Ninth	7 a. m.	92	97 $\frac{1}{4}$	
	26	do	3 p. m.	92	98	
	27	Tenth	7 a. m.	58	98	No fever. (Standing)
	27	do	8 p. m.	88	98	

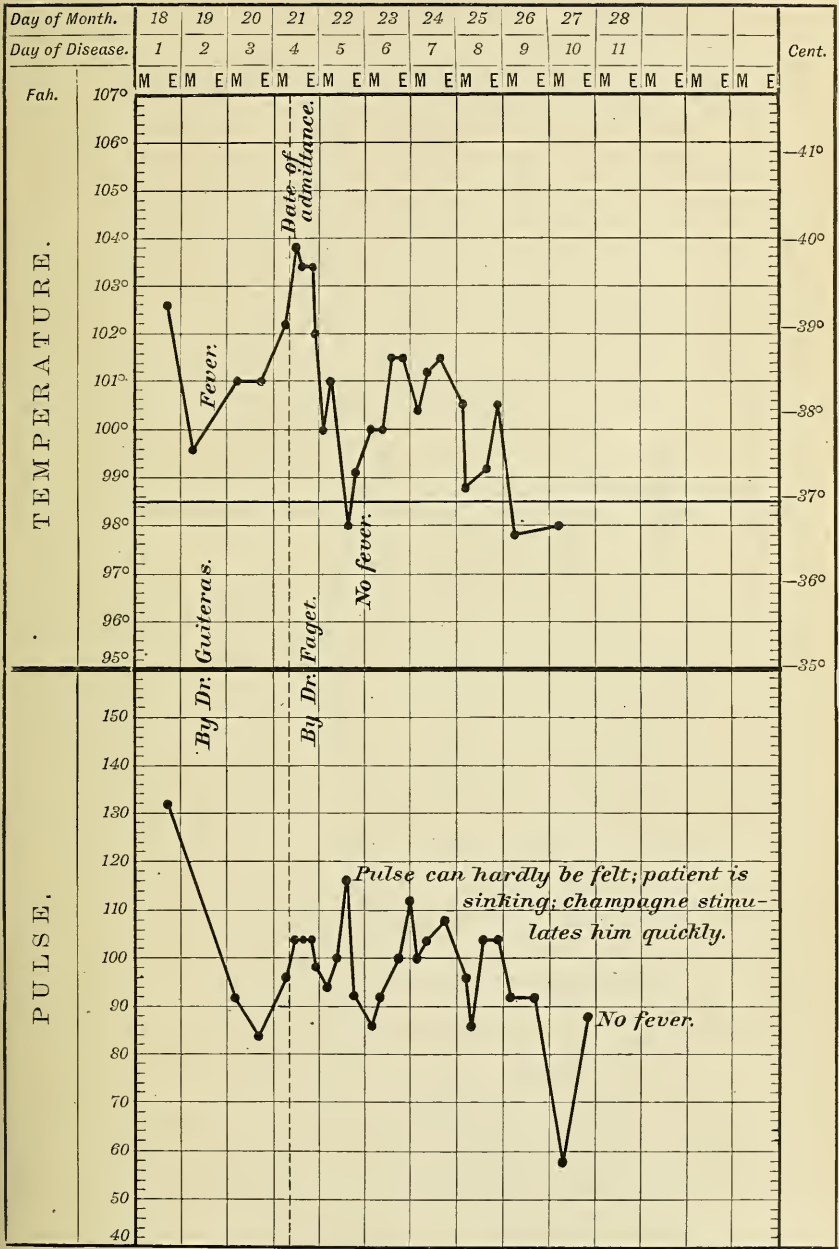
Camp Perry Hospital, epidemic of 1888 in Florida—Clinical chart, etc.—Continued.

CASE No. 7.—Edw. Painter, 35 years; 3 years in Jacksonville; left Jacksonville for Camp Perry September 7, 4 p. m.; taken sick on the cars; admitted September 17 in hospital; discharged October 1.



Camp Perry Hospital, epidemic of 1888 in Florida—Clinical chart, etc.—Continued.

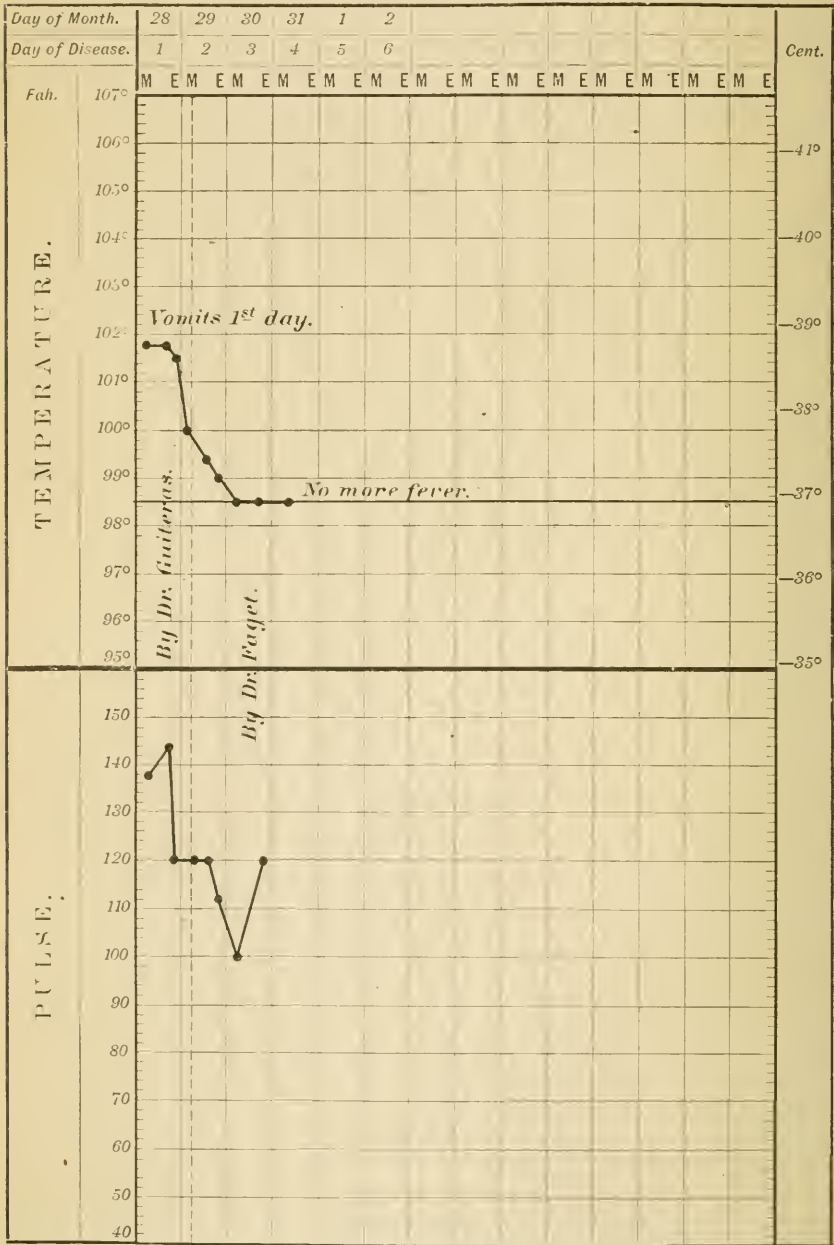
CASE No. 8.—Edwin Yannold, druggist, 37 years; left Jacksonville September 18, 4 p. m., for Camp Perry; taken sick in Jacksonville September 18, 1 p. m.; yellow fever, complicated with dysentery; admitted to hospital September 21, 12 m.; discharged October 6.

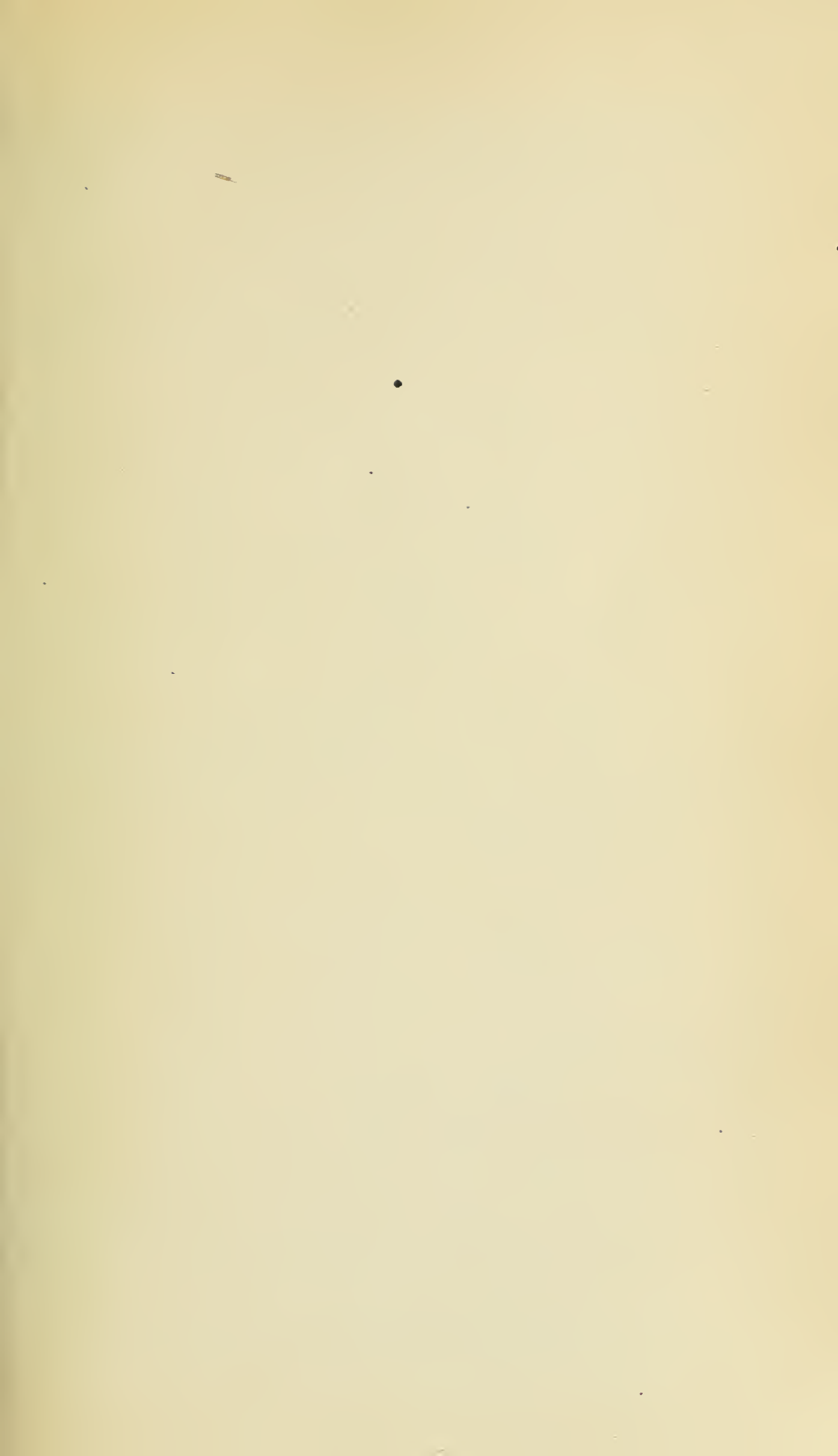


NOTE.—The dysentery was very severe, with much loss of blood. The patient was sinking; eyes sunken; cold perspiration; pulse hardly perceptible. The patient insisted on making his final dispositions.

Camp Perry Hospital, epidemic of 1888 in Florida—Clinical chart, etc.—Continued.

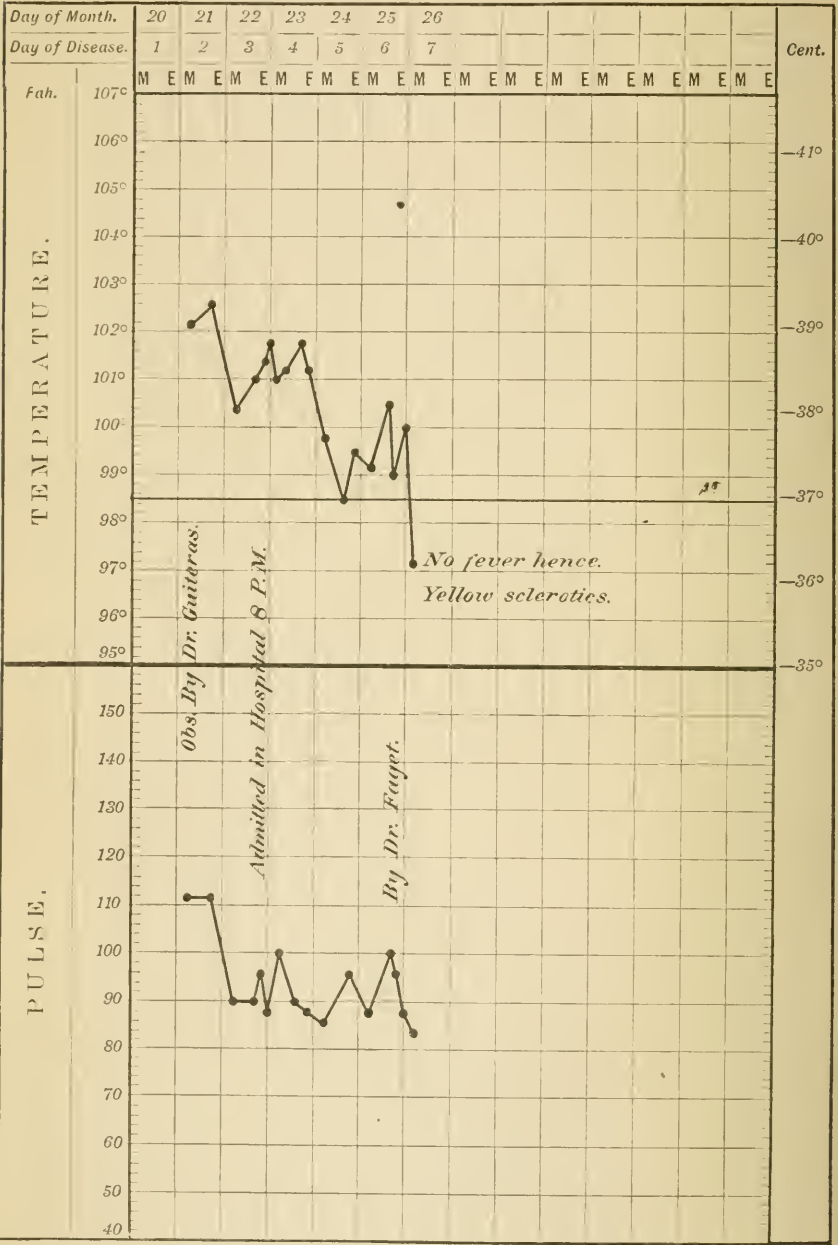
CASE No. 9. —Blanche Tyler, 5 years; left Jacksonville September 25 (one hour in Jacksonville; lived two miles from Jacksonville); taken sick in Camp Perry, September 27, 2 a. m.; yellow fever (light case); admitted in hospital September 19; discharged October 1.





Camp Perry Hospital, epidemic of 1888 in Florida—Clinical chart, etc.—Continued.

CASE No. 10.—Mrs. McCroon, 21 years, with 9 months baby; left Jacksonville September 17 for Camp Perry; taken sick September 19, p. m., fever since; admitted September 22 in Camp Perry Hospital; yellow fever; discharged September 28.



NOTE.—Bloody lochia returned during illness.

Discharged nineteenth day, October 6.

This case was one of the most serious from loss of blood in the form of dysentery; great prostration; eyes sunken; cold perspiration; pulse hardly perceptible. Champagne did him much good in that stage; laudanum given as injections.

NOTE.—Although a case of yellow fever, the pulse rose from the fourth day on account of the excessive weakness of the patient.

Case No. 9 (Light case).

Blanche Tyler; five years; accompanied by her mother. Lived two miles from Jacksonville. Admitted in Camp Perry September 25, having passed one hour in Jacksonville. Taken sick September 28, at 2 a. m.

Observations taken by—	Date.	Day.	Hour.	Pulse.	Temperature.	Remarks.
Dr. Guitéras...	Sept. 28	First	5 a. m.	138	101 $\frac{1}{2}$	Vomiting.
	28	..do	7 p. m.	144	101 $\frac{1}{2}$	
	28	..do	9 p. m.	120	101 $\frac{1}{2}$	
Dr. Fagét.....	29	Second	6 a. m.	120	100	
	29	..do	11 a. m.	120	99 $\frac{2}{3}$	
	29	..do	4 p. m.	112	99	
	30	Third	7 a. m.	100	98 $\frac{1}{2}$	
	30	..do	3 p. m.	120	98 $\frac{1}{2}$	
	Oct. 1	Fourth	7 a. m.	.....	98	

Discharged October 1.

Case No. 10.

Mrs. Macroon; 21 years; nursing a baby of seven weeks. Admitted to Camp Perry from Jacksonville September 17. Taken sick September 19, at night. Lochia re-appeared for the first time since delivery. September 20, fever.

Observations taken by—	Date.	Day.	Hour.	Pulse.	Temperature.	Remarks.
Dr. Guitéras...	Sept. 21	Second	a. m.	111	102 $\frac{1}{2}$	
	21	..do	p. m.	111	102 $\frac{1}{2}$	
	22	Third	6 a. m.	90	100 $\frac{2}{3}$	
Dr. Fagét.....	22	..do	3 p. m.	90	101	Admitted in hospital.
	22	..do	6 p. m.	96	101 $\frac{1}{2}$	
	22	..do	8 p. m.	88	101 $\frac{1}{2}$	
	23	Fourth	6 $\frac{1}{2}$ a. m.		101	
	23	..do	10 a. m.	100	101 $\frac{1}{2}$	
	23	..do	4 $\frac{1}{2}$ p. m.	90	101 $\frac{1}{2}$	
	23	..do	8 p. m.	88	101 $\frac{1}{2}$	Quinine, 15 grains.
	24	Fifth	10 a. m.	86	99 $\frac{1}{2}$	
	24	..do	1 p. m.		98 $\frac{1}{2}$	Quinine.
	24	..do	7 $\frac{1}{2}$ p. m.	96	99 $\frac{1}{2}$	
	25	Sixth	7 a. m.	88	99 $\frac{1}{2}$	
	25	..do	1 p. m.	100	100 $\frac{1}{2}$	Quinine.
	25	..do	4 p. m.	96	99	
	25	..do	7 p. m.	88	100	
	26	Seventh	7 a. m.	84	97 $\frac{1}{2}$	Convalescent.
	27	Eighth .....	.....	.....	.....	

Discharged September 28.

NOTE.—Bloody lochia continued until the 25th. Patient very weak.

Case No. 11.

Honoré Wanlin; forty-eight years; Belgian. Arrived in Jacksonville in January, 1888. Had malarial fevers in Jacksonville since June. Says he has had fever for fifteen days. Left Jacksonville and was admitted in Camp Perry September 26; had fever then. Admitted in hospital September 27 at 8 a. m.

Observations taken by—	Date.	Day.	Hour.	Pulse.	Temperature.	Remarks.
Dr. Guitéras...	Sept. 26	First.....	5 p. m.	93	102 $\frac{3}{5}$	Lumbar and abdominal pains.
Dr. Fagét.....	27	Second.....	9 a. m.	100	99 $\frac{1}{2}$	
	27	do.....	10 $\frac{1}{2}$ a. m.	80	100 $\frac{1}{2}$	
	27	do.....	3 p. m.	92	102 $\frac{3}{5}$	
	27	do.....	6 $\frac{1}{2}$ p. m.	81	101 $\frac{1}{2}$	
	28	Third.....	7 a. m.	88	100 $\frac{1}{2}$	
	28	do.....	3 p. m.	92	102 $\frac{1}{2}$	
	28	do.....	8 p. m.	81	101 $\frac{1}{2}$	
	29	Fourth.....	7 a. m.	78	98 $\frac{1}{2}$	
	29	do.....	2 p. m.	80	100 $\frac{1}{2}$	
	29	do.....	4 $\frac{1}{2}$ p. m.	96	101 $\frac{1}{2}$	Great prostration. Standing; convalescent.
	29	do.....	7 p. m.	88	101 $\frac{1}{2}$	
	30	Fifth.....	3 $\frac{1}{2}$ a. m.	76	98	
	30	do.....	6 a. m.	.....	98	
	30	do.....	3 p. m.	68	97	
	30	do.....	6 p. m.	68	97	
	Oct. 1	Sixth.....	7 $\frac{1}{2}$ a. m.	64	95 $\frac{1}{2}$	
	1	do.....	4 p. m.	58	96 $\frac{1}{2}$	
	2	Seventh.....	7 a. m.	51	95	
	4	Ninth.....	.....	64	.....	

NOTE.—The yellow coloration of the eyes is characteristic; no albumen found in the urine by ordinary test; large doses of quinine given during the remissions; 36 grains given on morning of the 30th. Discharged October 15.

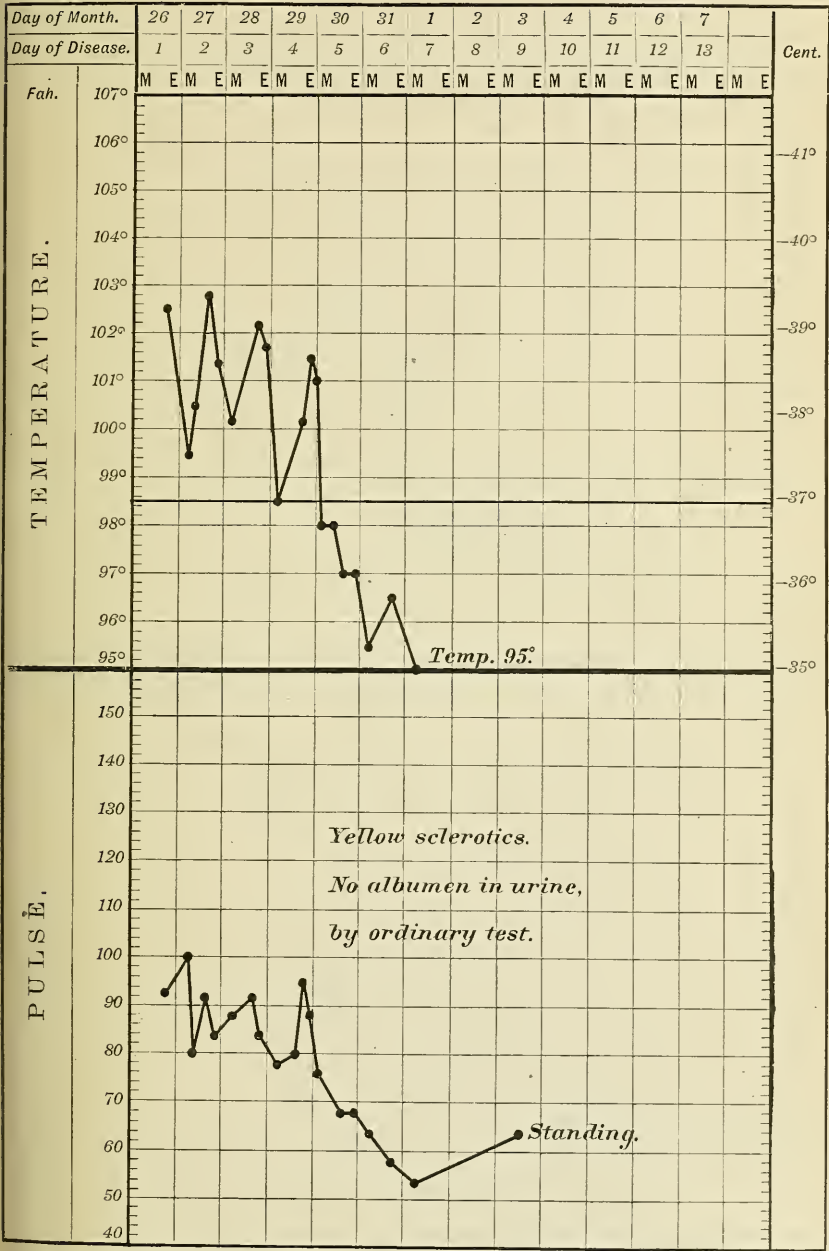
Case No. 12.

E. T. Chavous; thirty years; six years in Jacksonville. Admitted in Camp Perry, from Jacksonville, September 19; taken sick September 25 at 1 p. m.; admitted in hospital September 27.

Observations taken by—	Date.	Day.	Hour.	Pulse.	Temperature.	Remarks.
Dr. Guitéras...	Sept. 25	First.....	4 p. m.	96	102 $\frac{3}{5}$	Albumen in urine; notable quantity.
	26	Second.....	6 a. m.	90	100	
	26	do.....	9 a. m.	96	101	
	26	do.....	p. m.	99	101 $\frac{1}{2}$	
	27	Third.....	6 a. m.	90	100 $\frac{1}{2}$	
Dr. Fagét.....	27	do.....	5 p. m.	98	102 $\frac{1}{2}$	
	28	Fourth.....	7 a. m.	88	101 $\frac{1}{2}$	
	28	do.....	11 $\frac{1}{2}$ a. m.	96	102 $\frac{1}{2}$	
	28	do.....	3 p. m.	96	102 $\frac{1}{2}$	
	28	do.....	5 p. m.	92	102 $\frac{1}{2}$	Respiration 26.
	28	do.....	8 p. m.	94	102 $\frac{1}{2}$	
	29	Fifth.....	7 a. m.	92	100 $\frac{1}{2}$	
	29	do.....	1 $\frac{1}{2}$ p. m.	92	100 $\frac{1}{2}$	
	29	do.....	4 p. m.	92	101	Vomiting.
	29	do.....	7 p. m.	98	101 $\frac{1}{2}$	
	30	Sixth.....	3 $\frac{1}{2}$ a. m.	.....	97	
	30	do.....	6 a. m.	92	98	
	30	do.....	5 p. m.	96	98 $\frac{1}{2}$	
	Oct. 1	Seventh.....	7 a. m.	86	97 $\frac{1}{2}$	
	1	do.....	4 p. m.	81	98 $\frac{1}{2}$	
	2	Eighth.....	7 a. m.	84	97	
	2	do.....	3 p. m.	76	97 $\frac{1}{2}$	
	3	Ninth.....	7 a. m.	68	96 $\frac{1}{2}$	Convalescent.
	3	do.....	7 p. m.	64	.....	
	4	Tenth.....	6 p. m.	60	.....	
	5	Eleventh.....	.....	60	97	
	11	Seventeenth.....	.....	70	.....	
	12	Eighteenth.....	.....	80	.....	

Camp Perry Hospital, epidemic of 1888 in Florida—Clinical chart, etc.—Continued.

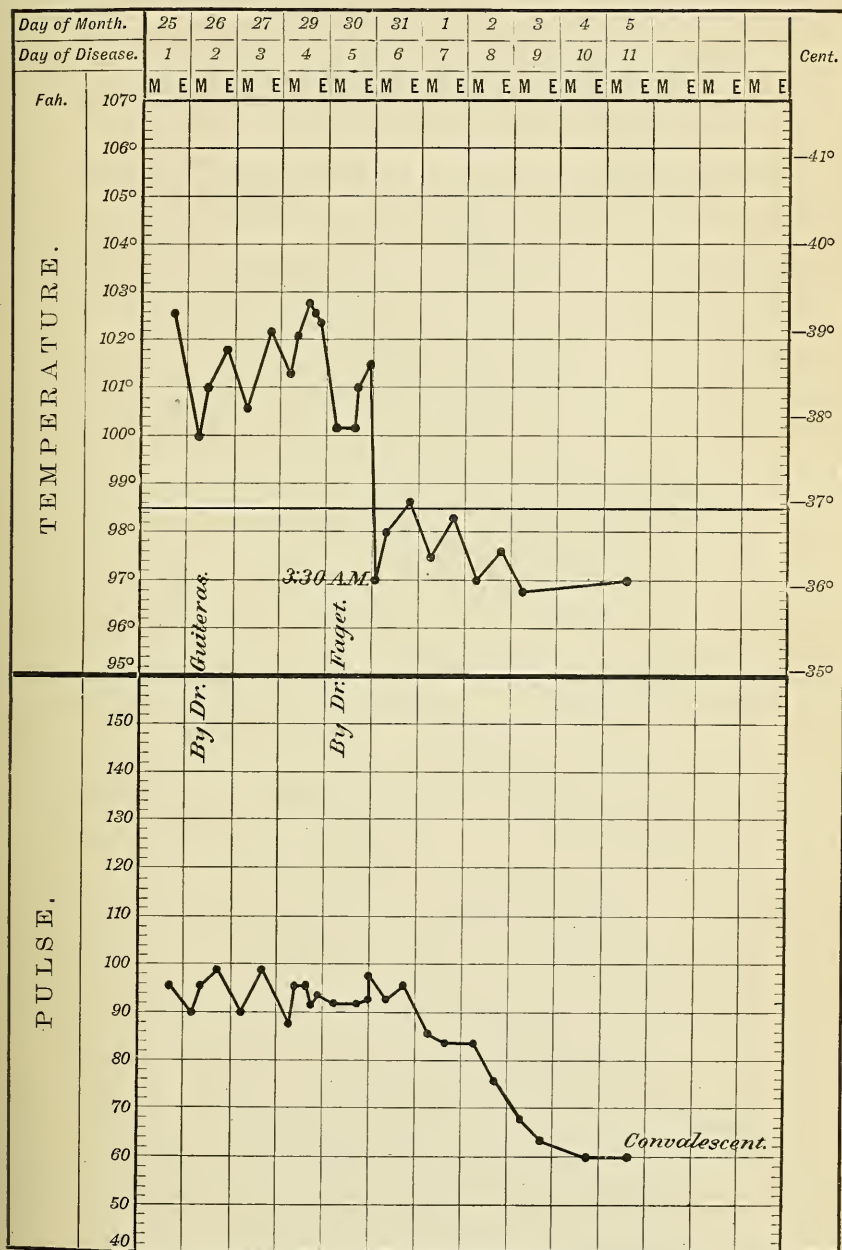
CASE No. 11.—Honoré Wanlin, 48 years; Belgian; left Jacksonville for Camp Perry September 26; had yellow fever, complicated with malaria; admitted in hospital September 27, 8 a. m.; discharged October 15.



NOTE.—Patient says he arrived in Jacksonville in January, 1888; that he has malarial fevers since June, 1888; that he has had fever for the last fifteen days. Large doses of quinine given during remissions. Great prostration.

Camp Perry Hospital, epidemic of 1888 in Florida—Clinical chart, etc.—Continued.

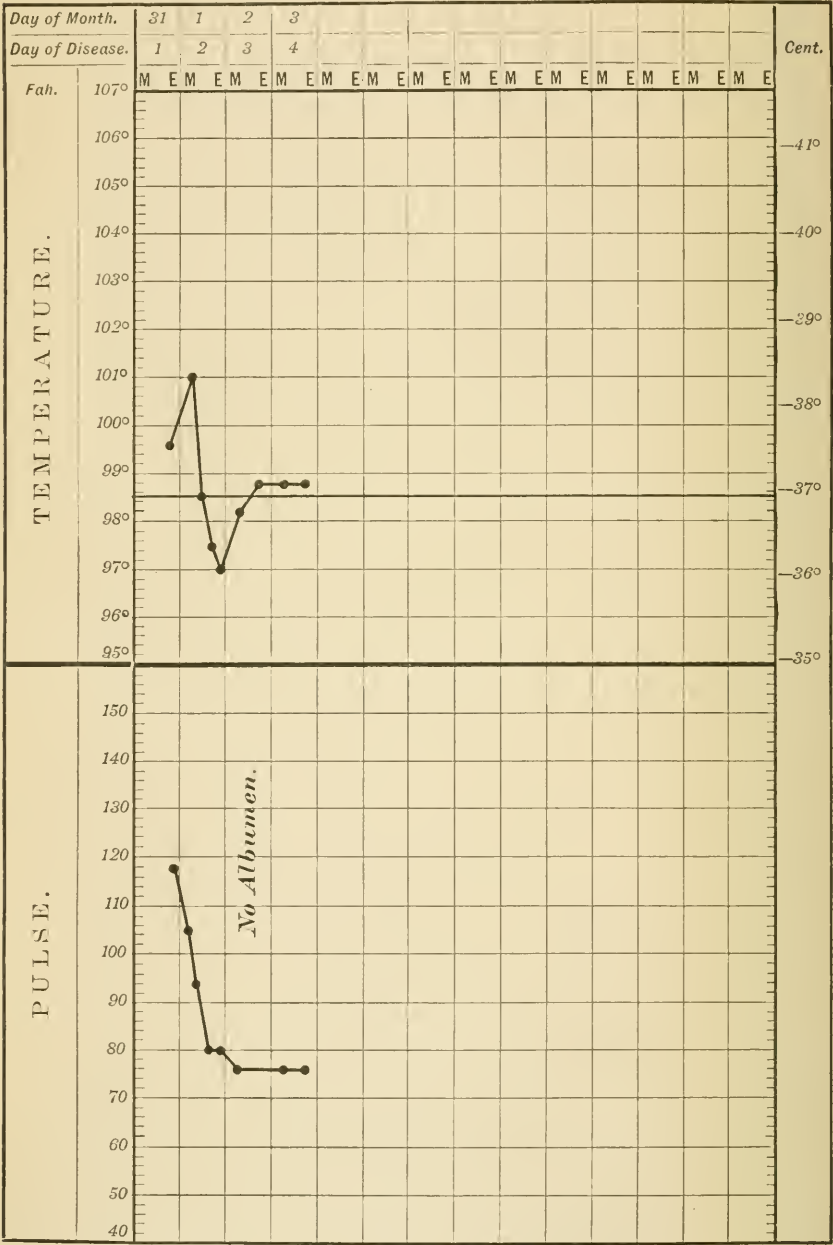
CASE No. 12.—E. T. Chavous, 30 years; six years in Jacksonville, left Jacksonville for Camp Perry September 19; taken sick in Camp Perry September 25; 1 p. m.; yellow fever; admitted in hospital September 27; discharged October 14.



NOTE.—Albumen in the urine from the first days; great irritability of stomach, with tenderness; vomiting of much bile; yellow suffusion of eyes.

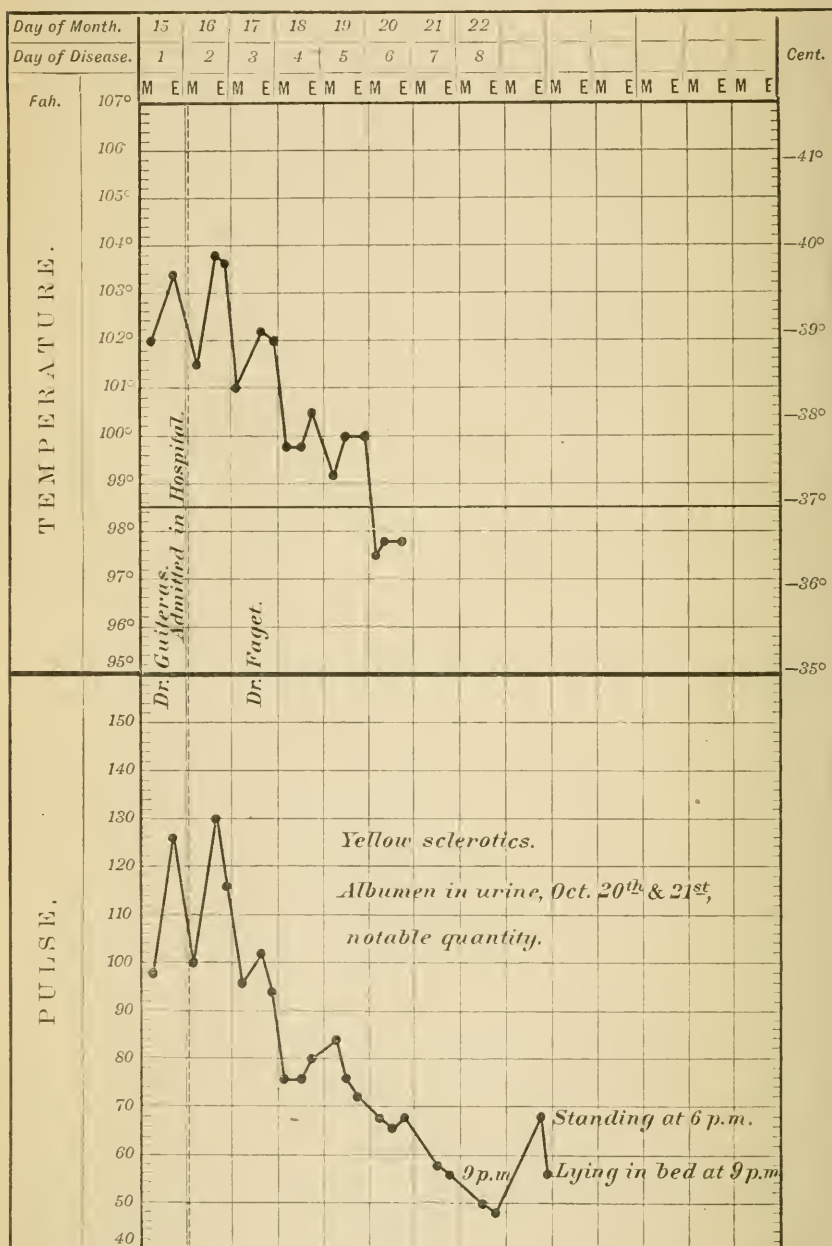
Camp Perry Hospital, epidemic of 1888 in Florida—Clinical chart, etc.—Continued.

CASE No. 13.—Felipe Dera, 22 years; Spanish; left Jacksonville and admitted to Camp Perry October 28; taken sick October 30, 12 m.; vomiting; yellow fever (very light case); admitted in hospital November 1; discharged November 4.



Camp Perry Hospital, epidemic of 1888 in Florida—Clinical chart, etc.—Continued.

CASE No. 11.—August Blum, 17 years; left Jacksonville October 13 for Camp Perry; taken sick in Camp Perry October 15, night; (chill, headache); yellow fever; admitted in hospital October 16, 6 a. m.; discharged October 25.



Severe pains in forehead, back, and limbs; distress of stomach; persistent vomiting with great efforts; characteristic color of eyes and skin; great prostration; uncertainty of gait and dazed expression during convalescence.

NOTE.—Although the pulse does not decrease regularly from the first days, as is the rule, it remains low comparatively to the temperature, and falls to 60 during convalescence. The constant vomiting might account for this irregularity in this, one of the most typical cases of yellow fever.

Case No. 13 (very light case).

Felipe Llera; twenty-two years; Spanish. Admitted in Camp Perry, from Jacksonville, October 28. Taken sick October 31 at noon, vomiting several times; pains in head and back.

Observations taken by—	Date.	Day.	Hour.	Pulse.	Temperature.	Remarks.
Dr. Fagét.	Oct. 31	First.....	7 p. m.	117	99 $\frac{3}{8}$	Vomiting.
	Nov. 1	Second.....	6 a. m.	105	101 $\frac{1}{2}$	
	1	do.....	9 a. m.	94	98 $\frac{3}{4}$	
	1	do.....	3 p. m.	80	97 $\frac{1}{4}$	
	1	do.....	7 p. m.	80	97	
	2	Third.....	7 a. m.	76	98 $\frac{1}{2}$	
	3	Fourth.....	7 a. m.	76	98 $\frac{3}{4}$	
	3	do.....	7 p. m.	76	98 $\frac{3}{4}$	

Discharged November 4.

NOTE.—Yellow coloration of eyes; no albumen in the urine (layer test). Want of correlation between pulse and temperature, as observed between first and second day.

Case No. 14.

August Blum; seventeen years; Bavarian. Admitted in Camp Perry, from Jacksonville, October 13; taken sick October 14 at night; chill and headache.

Observations taken by—	Date.	Day.	Hour.	Pulse.	Temperature.	Remarks.
Dr. Fagét.	Oct. 15	First.....	9 a. m.	99	102	Admitted to hospital.
	15	do.....	8 p. m.	126	103 $\frac{2}{5}$	
	16	Second.....	8 a. m.	100	101 $\frac{1}{4}$	
	16	do.....	5 p. m.	130	103 $\frac{3}{5}$	
	16	do.....	8 p. m.	116	103 $\frac{3}{5}$	
	17	Third.....	6 a. m.	96	101	Albumen in urine.
	17	do.....	1 p. m.	102	102 $\frac{1}{5}$	
	17	do.....	8 p. m.	94	102	
	18	Fourth.....	8 a. m.	76	99 $\frac{3}{5}$	
	18	do.....	12 m.	76	99 $\frac{3}{5}$	
	18	do.....	5 p. m.	80	100 $\frac{3}{5}$	Albumen in urine; ordinary test.
	19	Fifth.....	7 a. m.	84	99 $\frac{3}{5}$	
	19	do.....	12 m.	76	100	
	19	do.....	9 p. m.	72	100	
	20	Sixth.....	8 a. m.	68	97 $\frac{1}{5}$	
	20	do.....	11 a. m.	66	97 $\frac{3}{5}$	Standing. In bed.
	20	do.....	7 p. m.	68	97 $\frac{3}{5}$	
	21	Seventh.....	12 m.	58	.....	
	21	do.....	9 p. m.	56	.....	
	22	Eighth.....	8 p. m.	50 to 48	97 $\frac{1}{5}$	
	22	do.....	6 p. m.	68	.....	
	23	do.....	9 p. m.	56	.....	

Discharged October 25.

NOTE.—The yellow coloration of the eyes is characteristic. Quinine was given on the 18th and 19th, on account of pronounced remissions.

Case No. 15.

Neal McCalliom; fifty years; Irish; Red Cross nurse from Philadelphia; in Jacksonville since September 19. Admitted to Camp Perry October 11; taken sick morning of October 18; restless, vomiting, almost delirious.

Observations taken by—	Date.	Day.	Hour.	Pulse.	Temperature.	Remarks.
Dr. Fagét	Oct. 18	First	a. m.	99	102	Removed.
	18	do	p. m.	96	102 $\frac{1}{2}$	
	19	Second	5 a. m.	96	102	
	19	do	7 a. m.	86	101	
	19	do	12 m.	90	101 $\frac{1}{2}$	
	19	do	5 p. m.	96	102 $\frac{1}{2}$	Albumen in urine; notable quantity.
	19	do	9 p. m.	92	102 $\frac{1}{2}$	
	20	Third	8 a. m.	82	100	
	20	do	7 p. m.	76	100 $\frac{1}{2}$	
	20	do	9 p. m.	70	99 $\frac{1}{2}$	
	21	Fourth	7 a. m.	66	98 $\frac{1}{2}$	Sitting up. Sleeping.
	21	do	12 m.	62	98 $\frac{1}{2}$	
	21	do	9 p. m.	58	98 $\frac{1}{2}$	
	22	Fifth	a. m.	56	.....	
	22	do	9 p. m.	58	97 $\frac{1}{2}$	
	23	Sixth	9 p. m.	58	.....	
	24	Seventh	4 p. m.	74	.....	
	24	do	9 p. m.	52	.....	
	25	Eighth	8 a. m.	60	.....	
	26	Ninth	8 p. m.	68	.....	
	27	Tenth	9 p. m.	64	.....	

Discharged twelfth day, October 29. The yellow suffusion of the eyes is well marked.

Case No. 16.

E. Burritt, forty-one years. Taken sick in Jacksonville on the morning of October 19; chill, vomiting, pain in head and back. Left Jacksonville and admitted to Camp Perry October 20, at 4 p. m. Admitted to hospital October 21.

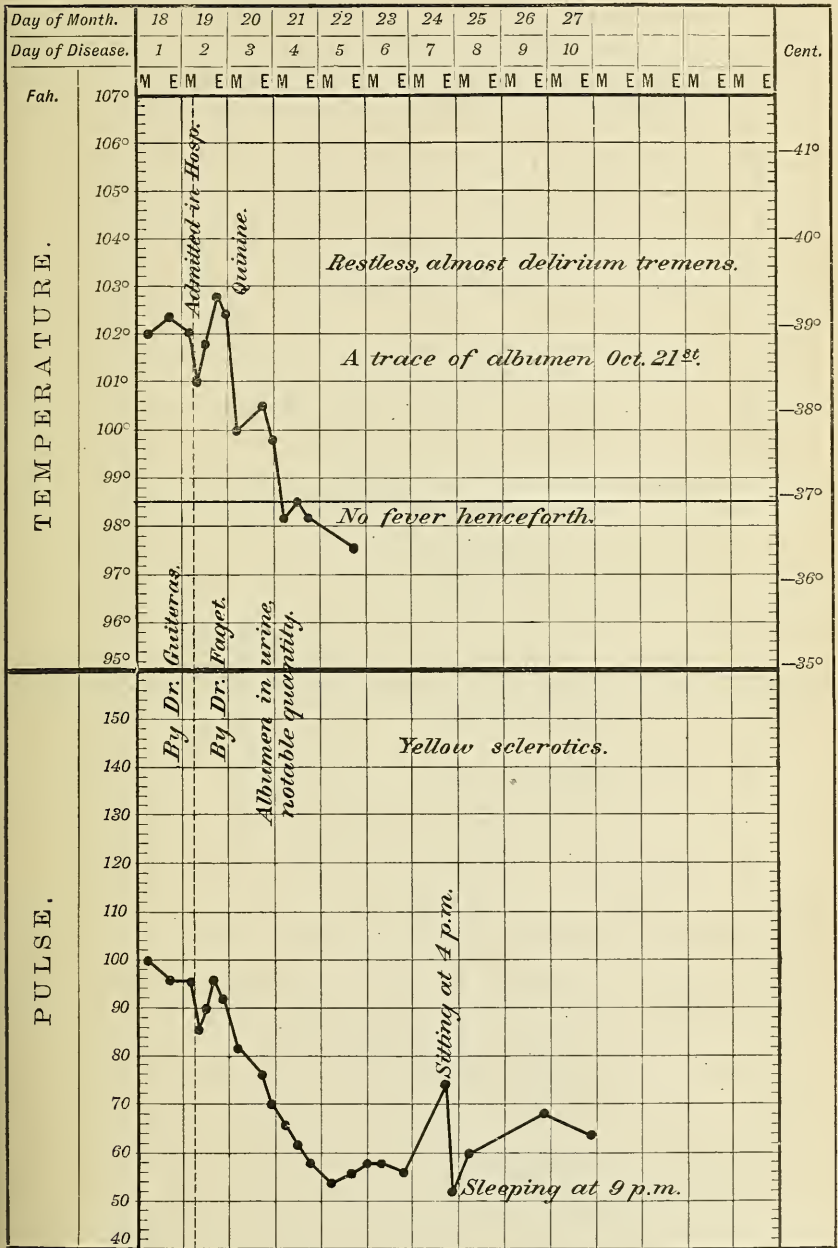
Observations taken by—	Date.	Day.	Hour.	Pulse.	Temperature.	Remarks.
Dr. Fagét	Oct. 20	Second	6 p. m.	108	102	Traces of albumen.
	21	Third	11 a. m.	94	103	
	21	do	9 p. m.	102	101 $\frac{1}{2}$	
	22	Fourth	7 a. m.	94	101 $\frac{1}{2}$	
	22	do	11 a. m.	94	102	
	22	do	4 p. m.	94	101 $\frac{1}{2}$	
	22	do	8 p. m.	96	101	
	23	Fifth	8 a. m.	86	100	
	23	do	12 m.	92	100	
	23	do	5 p. m.	94	101	
	23	do	9 p. m.	90	100 $\frac{1}{2}$	Sitting up. No albumen. Do. Two days going about.
	24	Sixth	7 a. m.	86	98 $\frac{1}{2}$	
	24	do	4 p. m.	86	99 $\frac{1}{2}$	
	24	do	9 p. m.	80	99	
	25	Seventh	7 a. m.	92	98 $\frac{1}{2}$	
	25	do	8 p. m.	72	98 $\frac{1}{2}$	
	26	Eighth	7 a. m.	72	97 $\frac{1}{2}$	
	27	Ninth	7 p. m.	64	97 $\frac{1}{2}$	
	27	do	9 p. m.	54	97	
	28	Tenth	10 a. m.	70	.....	

Discharged (eleventh day) October 29.

Considerable headache and tenderness in epigastric region, with vomiting. Yellow suffusion of eyes well marked throughout and continued long in convalescence. Hacking cough during and after the course of disease,

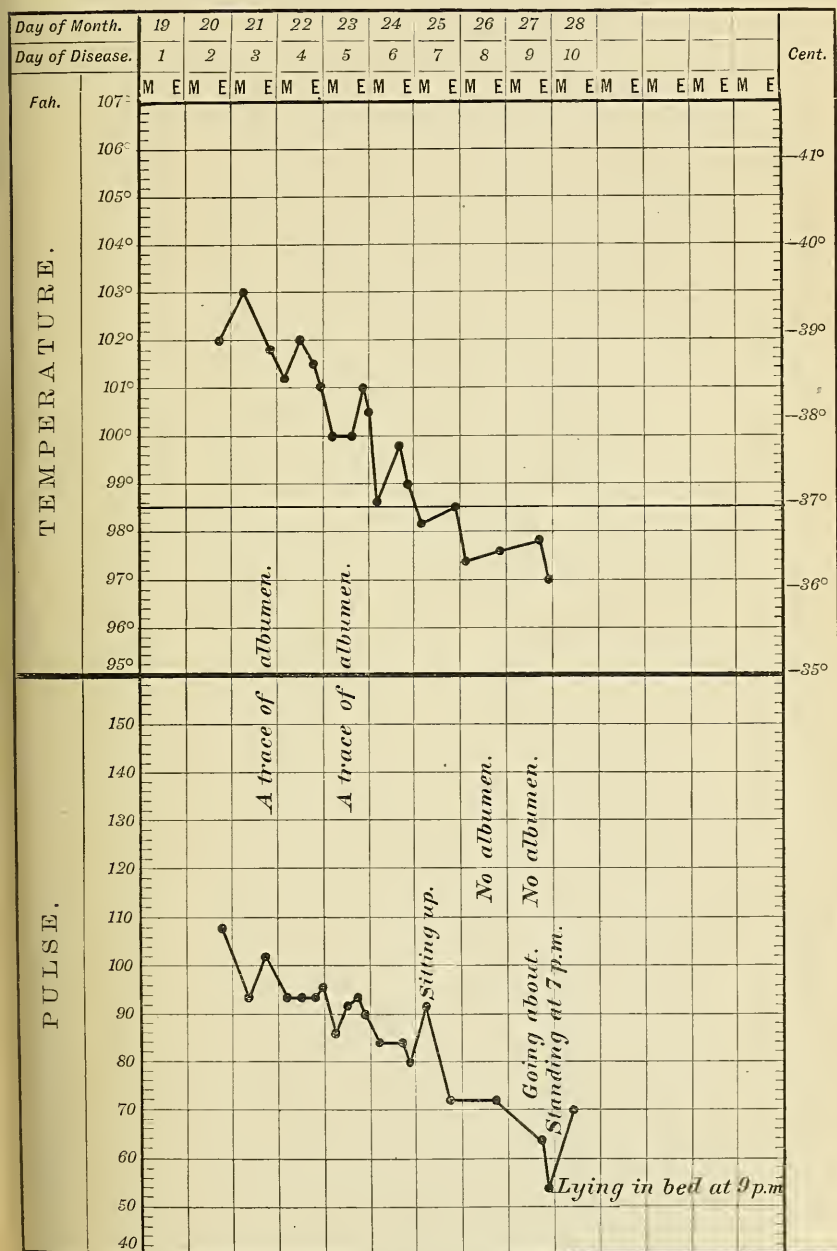
Camp Perry Hospital, epidemic of 1888 in Florida—Clinical chart, etc.—Continued.

CASE No. 15.—Neal McCalliom, 50 years; Philadelphia; nurse in Jacksonville since September 19; left for Camp Perry October 11; taken sick October 18, a. m.; yellow fever; admitted in hospital October 19, 6 a. m.; discharged October 29.



Camp Perry Hospital, epidemic of 1888 in Florida—Clinical chart, etc.—Continued.

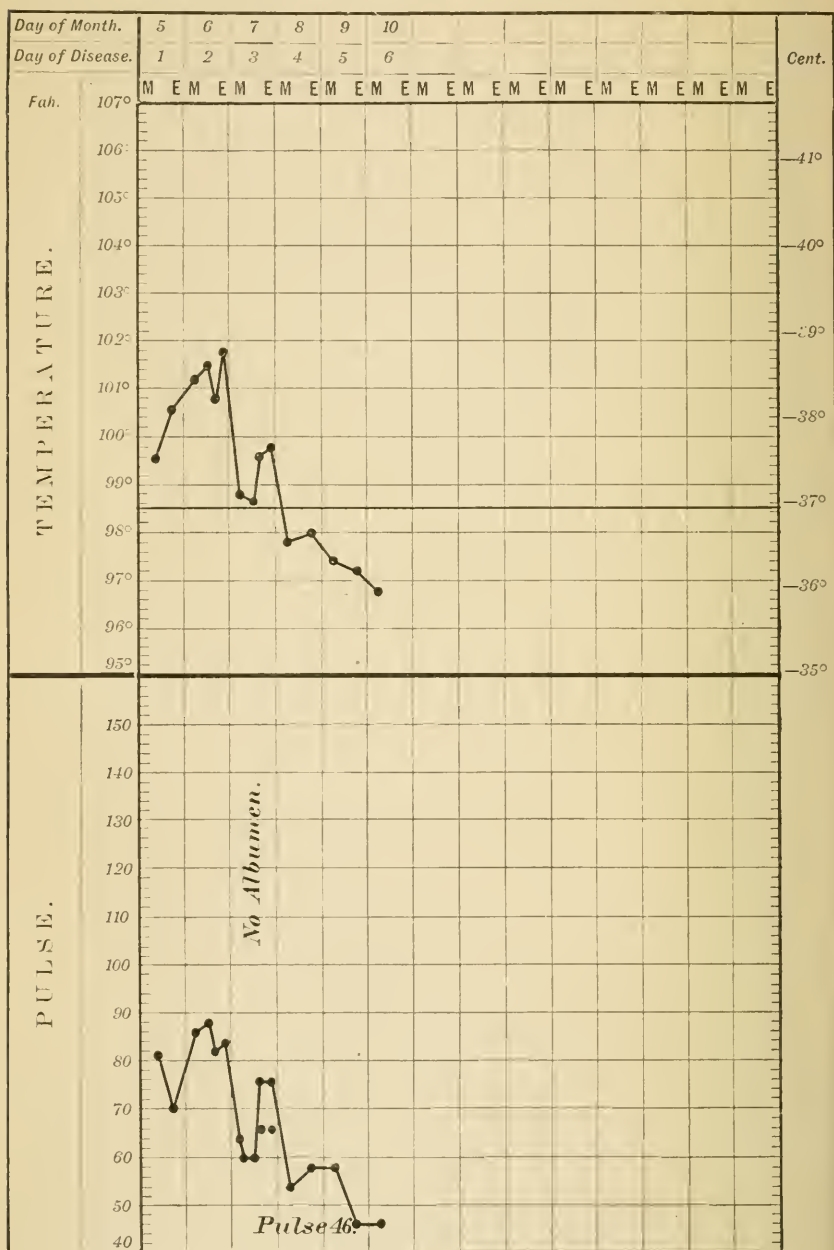
CASE No. 16.—E. Burritt, 41 years; taken sick in Jacksonville October 19, a. m.; chill, pain in head and back, vomiting; left Jacksonville for Camp Perry October 10, 4 p. m.; admitted in hospital October 21, a. m.; discharged October 29.



NOTE.—Considerable headache and tenderness in epigastric region; hacking cough and induration at apex of right lung.

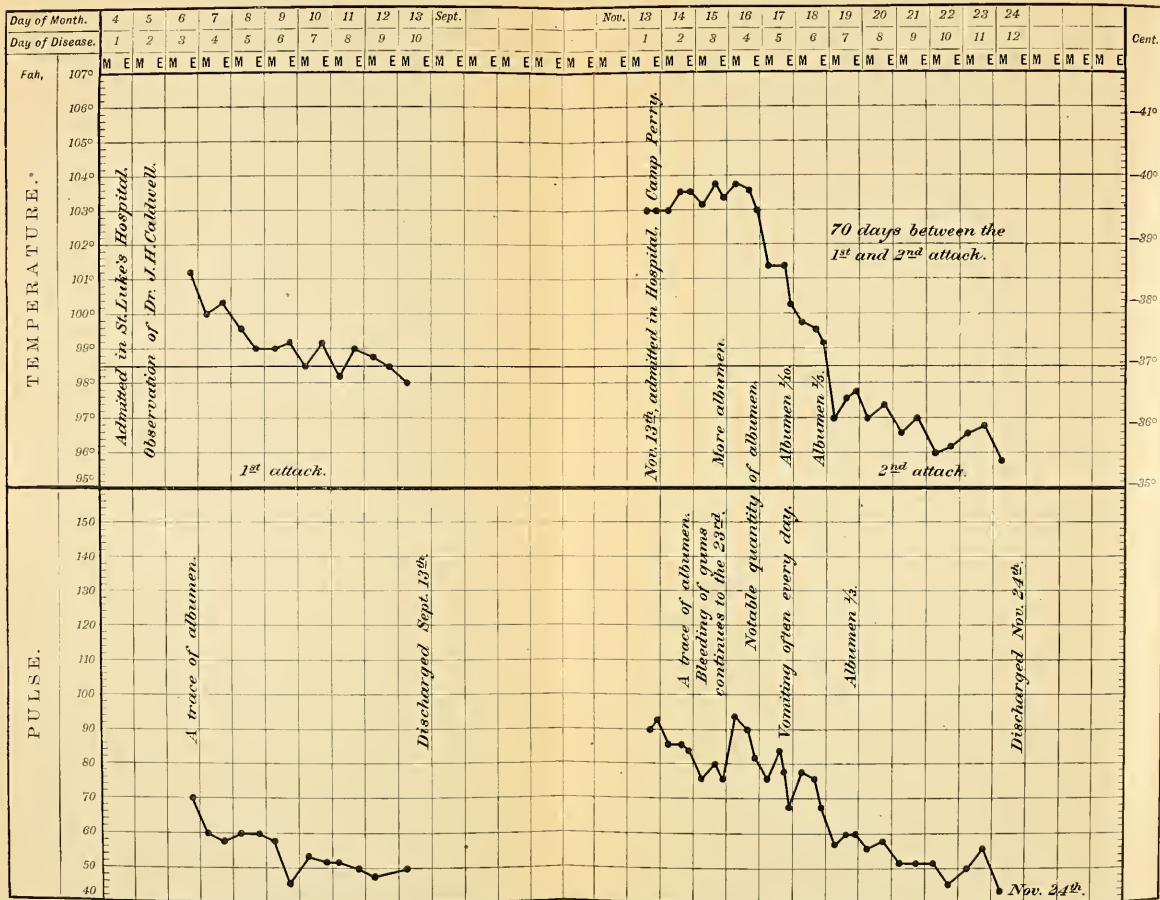
Camp Perry Hospital, epidemic of 1888 in Florida—Clinical chart, etc.—Continued.

CASE No. 17.—Hubbard, 27 years; conductor of government train; taken sick at Camp Perry, morning of November 5; chill; supraorbital pains, and general pain; vomiting at night; yellow fever (light case); admitted in hospital November 6; discharged November 10.



Camp Perry Hospital, epidemic of 1888 in Florida—Clinical chart, etc.—Continued.

CASE No. 18.—Isaac Barber, 27 years; employed at Camp Perry; returned to Jacksonville November 7; taken sick at Jacksonville November 13, a. m.; returned to Camp Perry November 13, p. m.; two attacks of yellow fever; admitted in hospital November 13, 5 p. m.



NOTE.—This patient, employed as lamp-boy at Camp Perry from September 14, returned to Jacksonville, on a certificate of previous attack, on November 7; lived in Jacksonville by the sea wall; taken sick on the 13th; returned to Camp Perry and admitted in hospital November 13. From Dr. Caldwell I obtained the chart of his previous attack: Taken sick at Jacksonville September 4; discharged September 13. Admitted in Camp Perry September 14.

Case No. 17.

Hubbard, twenty-seven years; conductor of Government train carrying refugees from Jacksonville to Camp Perry; was daily in Jacksonville. He was seated in the cars on October 29, next to Mrs. Crowell, then sick of malignant yellow fever, of which she died two days after, at the hospital of Camp Perry. Mr. Hubbard took sick November 5, in the morning; chill, supraorbital pains and general pains; vomiting at night.

Observations taken by—	Date.	Day.	Hour.	Pulse.	Temperature.	Remarks.
Dr. Fagét.....	Nov. 5	First	11 a. m.	81	99 $\frac{3}{8}$	Moved to hospital.
	5	do	7 p. m.	70	100 $\frac{3}{8}$	
	6	Second	7 a. m.	86	101 $\frac{1}{2}$	
	6	do	12 m.	88	101 $\frac{1}{2}$	
	6	do	2 p. m.	82	100 $\frac{3}{8}$	
	6	do	8 p. m.	84	101 $\frac{1}{2}$	
	7	Third	6 a. m.	64	98 $\frac{3}{8}$	
	7	do	10 a. m.	60	-----	
	7	do	12 m.	60	98 $\frac{3}{8}$	
	7	do	6 p. m.	76	99 $\frac{3}{8}$	
	7	do	8 p. m.	76	99 $\frac{3}{8}$	
	8	Fourth	7 a. m.	54	97 $\frac{3}{8}$	
	8	do	7 p. m.	58	98	
	9	Fifth	9 a. m.	58	97 $\frac{1}{2}$	
	9	do	9 p. m.	46	97 $\frac{1}{2}$	
	10	Sixth	7 a. m.	46	96 $\frac{1}{2}$	
	10	do	9 p. m.	46	-----	

Discharged (seventh day) November 10. November 12, 9 a. m., pulse, 48; temperature, 97 $\frac{1}{8}$.

Considerable pains in head, orbits, limbs, and back, until the end of third day. Yellow coloration of eyes and great weakness during convalescence.

Case No. 18. (Double attack.)

Isaac Barber, twenty-seven years. Says he had an attack of yellow fever in 1877, in Jacksonville; pronounced yellow fever by his attending physician, Dr. Holt. This year (1888) he was taken sick in Jacksonville on the 3d or 4th of September; admitted on the 4th in St. Luke's Hospital; seen and treated by Dr. F. H. Caldwell, through whose kindness I obtained the following observation. Admitted September 4 in St. Luke's Hospital at 2 p. m.

Observations taken by—	Date.	Day.	Hour.	Pulse.	Temperature.	Remarks.
Dr. Fagét.....	Sept. 4	First or second	-----	-----	-----	Traces of albumen.
	6	Third	p. m.	70	101 $\frac{1}{2}$	
	7	Fourth	a. m.	60	100	
	7	do	p. m.	58	100 $\frac{3}{8}$	
	8	Fifth	a. m.	60	99 $\frac{3}{8}$	
	8	do	p. m.	60.	99	
	9	Sixth	a. m.	58	99	
	9	do	p. m.	58	99 $\frac{1}{2}$	
	10	Seventh	a. m.	46	98 $\frac{1}{2}$	
	10	do	p. m.	54	99 $\frac{1}{2}$	
	11	Eighth	a. m.	52	98 $\frac{1}{2}$	
	11	do	p. m.	50	99 $\frac{1}{2}$	
	12	Ninth	a. m.	48	98 $\frac{3}{8}$	
	12	do	p. m.	50	98 $\frac{1}{2}$	
	13	Tenth	a. m.	50	98	

Discharged September 13 (ten days sick).

Diagnosis: Yellow fever; remarkably low pulse. He left Jacksonville for Camp

Perry September 14. Employed at Camp Perry as lamp-boy from September 15 to November 6; returned to Jacksonville November 7, on a certificate of a previous attack. In Jacksonville lived about the soap works, a badly infected locality; was taken sick morning of November 13, six days after his return from Camp Perry. He left Jacksonville to return to Camp Perry same day, November 13, suffering from intense headache and fever. Admitted in Camp Perry hospital November 13, at 5 p. m.

Observations taken by—	Date.	Day.	Hour.	Pulse.	Temperature.	Remarks.
Dr. Fagét.....	Nov. 13	First	5 p. m.	90	103	
	13	do	7 p. m.	92	103	
	14	Second	7 a. m.	86	103	A trace of albumen.
	14	do	1 p. m.	86	103½	Yellow suffusion of eyes.
	14	do	8 p. m.	85	103½	Notable quantity of albumen.
	15	Third	6 a. m.	76	103½	Bleeding gums through the whole course; vomits.
	15	do	1 p. m.	80	103½	
	15	do	9 p. m.	76	103½	Albumen one-fifteenth.
	16	Fourth	7 a. m.	94	103½	Vomits frequently.
	16	do	2 p. m.	90	103½	Very somnolent all the time.
	16	do	7 p. m.	82	103	Albumen one-fifteenth.
	17	Fifth	7 a. m.	76	101½	
	17	do	1 p. m.	84	101½	Vomits.
	17	do	6 p. m.	78	100½	Delirious when awake.
	17	do	9 p. m.	68	—	Albumen one-fifth.
	18	Sixth	6 a. m.	78	99½	
	18	do	1 p. m.	76	99½	Albumen one-third.
	18	do	7 p. m.	68	99½	
	19	Seventh	7 a. m.	58	97	
	19	do	1 p. m.	60	97½	
	19	do	4 p. m.	60	97½	Impairment of vision and memory.
	20	Eighth	6 a. m.	56	97	Yellowskin, well marked.
	20	do	4 p. m.	58	97½	Mental condition good.
	21	Ninth	7 a. m.	52	96½	Albumen one-fourth.
	21	do	4 p. m.	52	97	
	22	Tenth	7 a. m.	52	96	Albumen one-twentieth.
	22	do	5 p. m.	46	96½	Bleeding of gums stops to day; patient gets up.
	23	Eleventh	8 a. m.	50	96½	
	23	do	7 p. m.	53	96½	
	24	Twelfth	8 a. m.	44	95½	

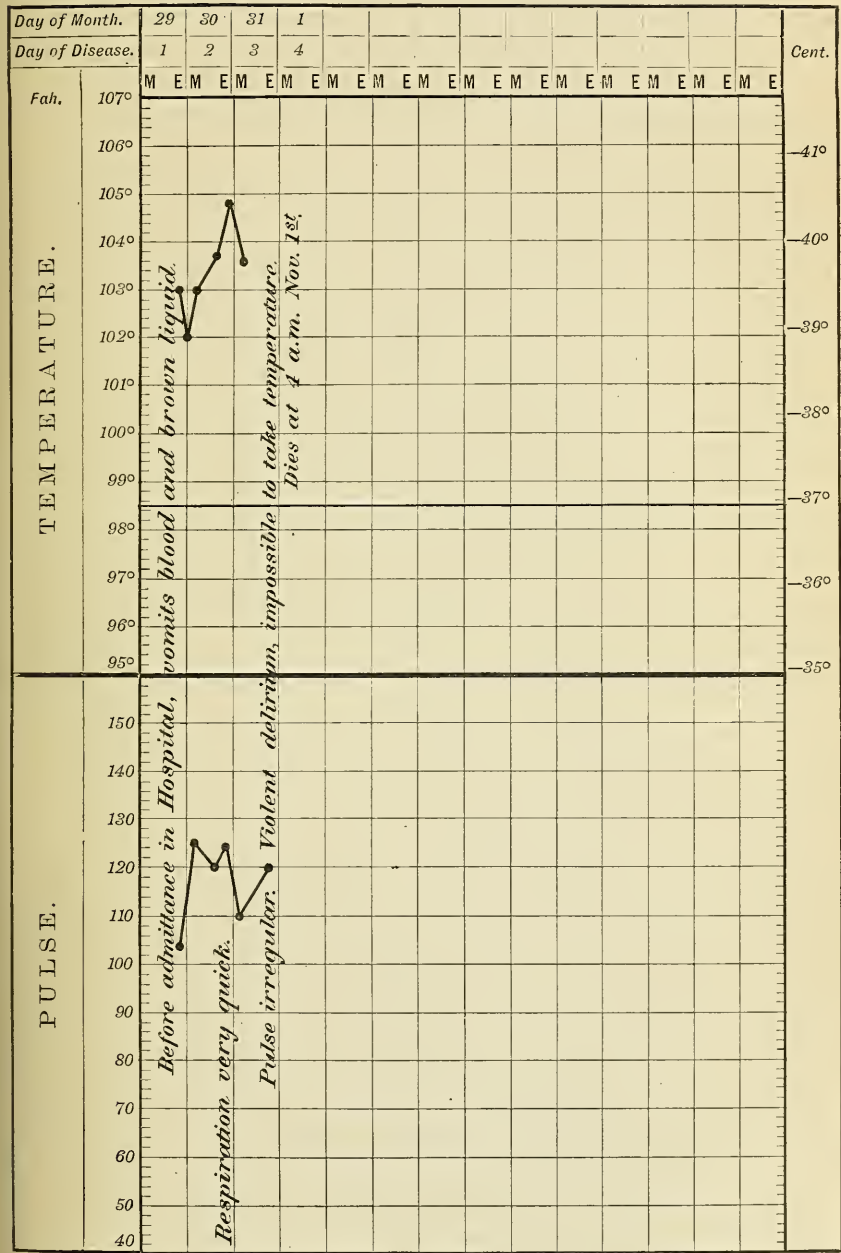
Discharged November 24.

Case No. 19 (fatal).

Mrs. Bertha Crowell, thirty-seven years; Chicago nurse; alcoholic habit. Says she was taken sick in Jacksonville, morning of October 29. Very sick and restless on the cars. Admitted in Camp Perry October 29, at 8 p. m.; on being admitted she first vomited a little blood; then a brown liquid; black vomit. She was removed same night, at 9 p. m., to the hospital, complaining loudly and most piteously of her head, knees, limbs, and back. She continued to so complain until her death, two days after. She was restless all the time and respiration very fast; delirium set in the next day, October 30, and became violent during night and day of the 31st. She died at 4 a. m., November 1. Although she vomited several times, the black vomit was not renewed before her death, but was found in the stomach three hours after death. The liver was also found yellow and enlarged, as is the rule in yellow fever.

Camp Perry Hospital, epidemic of 1888 in Florida—Clinical chart, etc.—Continued.

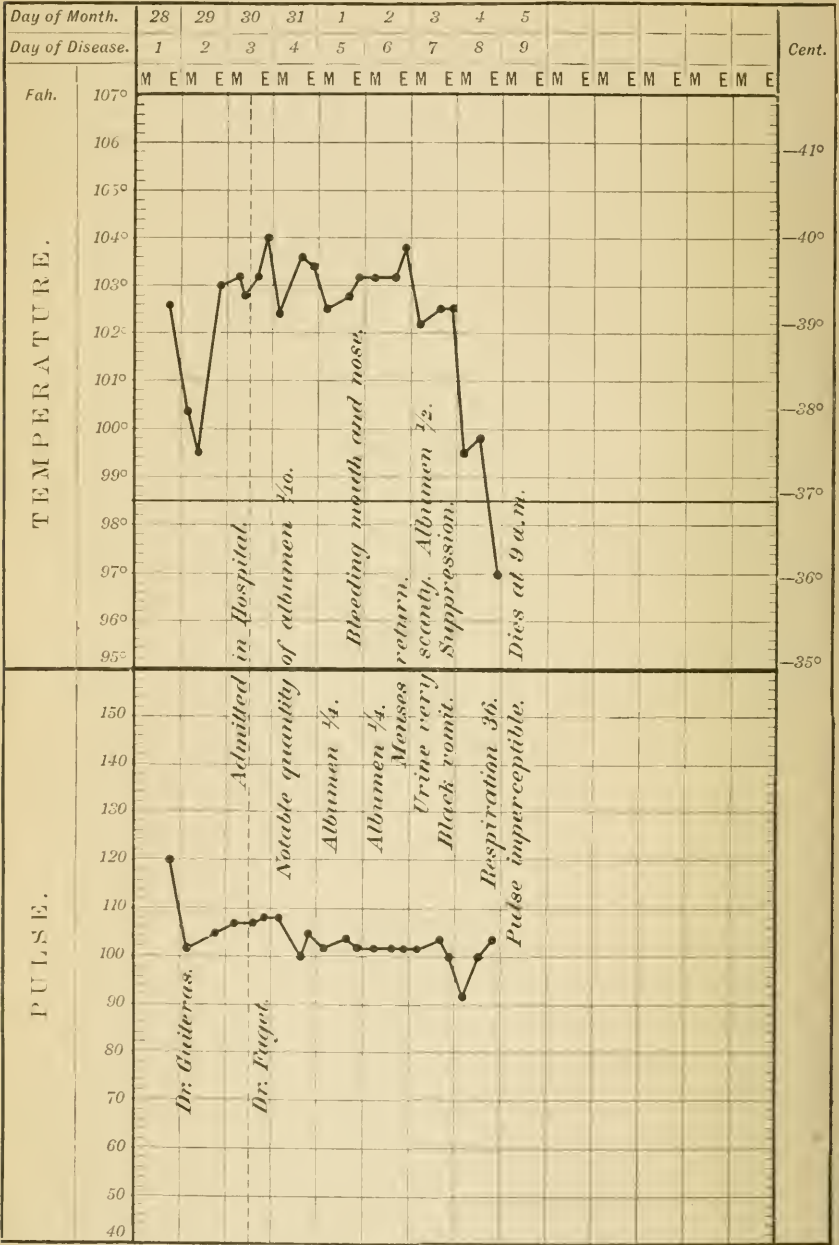
CASE No. 19.—Mrs. Crowell, 37 years; Chicago; nurse; taken sick October 29, morning, at Jacksonville; admitted in Camp Perry October 29, 8 p. m.; yellow fever; transferred to hospital October 29, 9 p. m.; died at 4 a. m., November 1.



NOTE.—The patient vomited blood and a brown liquid on her arrival at Camp Perry before being transferred to hospital camp. She suffers intensely from forehead and all the limbs and back. Very restless. Respiration very quick. She vomits several times a clear liquid, but black; vomit is not repeated; 3 hours after death an incision is made in the epigastric region; the liver is found enlarged and yellow; black vomit in stomach; body becomes very yellow and dark spots of extravasations extend over the face, forehead, cheeks, and lips.

Camp Perry Hospital, epidemic of 1888 in Florida—Clinical chart, etc.—Continued.

CASE No. 20.—Mrs. Alice Simmons, 28 years; nursing a 19 months baby; left Uptonville for Camp Perry October 27 at 10 a. m.; taken sick October 28, 1 p. m.; yellow fever; admitted October 30, 6 a. m., in hospital; died at 9 a. m. November 5.



NOTE.—Tongue dry and bloody from first days. The facies has been yellow and pale from the first days. Two hours after death the body became dark yellow (mahogany) with rapidly progressing black spots (extravasations) starting from dependent parts of body.

Observations taken by—	Date.	Day.	Hour.	Pulse.	Temperature.	Remarks.
Dr. Fagét.....	Oct. 29	First.....	9 p. m.	104	102	
	30	Second.....	6 a. m.	124	103	A trace of albumen.
	30	do.....	1 p. m.	120	100 $\frac{1}{2}$	
	30	do.....	7 p. m.	124	104 $\frac{1}{2}$	Notable quantity of albumen.
	31	Third.....	7 a. m.	110	103 $\frac{1}{2}$	Suppression of urine.
	31	do.....	7 p. m.	120	.....	Violent delirium.

Died November 1, at 4 a. m.

The body becomes rapidly yellow and black spots extend over the face, forehead, cheeks and lips and ears. Before burial, a short incision was made in the epigastrium, exposing liver and stomach, which are characteristic of yellow fever.

Case No. 20 (fatal).

Mrs. Simmons, twenty-eight years; nursing a nineteen months old baby; weak, emaciated, and sickly; very likely in the first stage of phthisis; left Uptonville, for Camp Perry with her three children, accompanying her husband; taken sick with yellow fever at Uptonville and was removed from that place to Camp Perry Hospital, on October 27. Admitted in Camp Perry, October 27. She took sick October 23, at 1 p. m. Admitted in hospital October 30; died November 5, at 9 a. m.

Observations taken by—	Date.	Day.	Hour.	Pulse.	Temperature.	Remarks.
Dr. Guitéras...	Oct. 28	First.....	4 p. m.	120	102 $\frac{3}{4}$	
	29	Second.....	6 a. m.	102	100 $\frac{3}{4}$	
	29	do.....	9 a. m.	.....	99 $\frac{1}{2}$	
	29	do.....	8 p. m.	105	103	
	30	Third.....	6 a. m.	.....	103 $\frac{3}{4}$	
Dr. Fagét.....	30	do.....	7 a. m.	107	102 $\frac{1}{2}$	Eyes and skin pale yellow.
	30	do.....	1 p. m.	107	103 $\frac{3}{4}$	Spat and continued to spit spumy blood.
	30	do.....	7 p. m.	108	104	Notable quantity of albumen in urine.
	31	Fourth.....	7 a. m.	108	102 $\frac{2}{3}$	Menses reappear, first time since parturition, and continue.
	31	do.....	3 p. m.	100	103 $\frac{3}{4}$	About one-tenth albumen.
	31	do.....	7 p. m.	105	103 $\frac{1}{2}$	
	Nov. 1	Fifth.....	6 a. m.	102	102 $\frac{1}{2}$	Bloody mouth and nose.
	1	do.....	3 p. m.	104	102 $\frac{1}{2}$	Dry and bloody tongue.
	1	do.....	8 p. m.	102	103 $\frac{1}{2}$	Albumen, one-fourth.
	2	Sixth.....	7 a. m.	102	101 $\frac{1}{2}$	
	2	do.....	1 p. m.	102	103 $\frac{1}{2}$	
	2	do.....	5 p. m.	102	103 $\frac{3}{4}$	Albumen, one-quarter.
	3	Seventh.....	7 a. m.	102	102 $\frac{1}{2}$	
	3	do.....	1 p. m.	104	102 $\frac{1}{2}$	Albumen, one-half.
	3	do.....	6 p. m.	100	102 $\frac{1}{2}$	Suppression of urine.
	4	Eighth.....	7 a. m.	92	99 $\frac{1}{2}$	Black vomit begins.
	4	do.....	12 m.	100	99 $\frac{3}{4}$	Respiration, 36.
	4	do.....	7 p. m.	104	97	Respiration, 36.

Died (ninth day) November 5, 9 a. m. Suppression of urine since night of 3d.

NOTE.—Body becomes dark yellow (mahogany), two hours after death.

Case No. 21.

J. Simmons, twenty-nine years; taken sick at Uptonville, October 26, at 3 a. m.; chill, headache, aching limbs, profuse perspiration. Removed to Camp Perry Hospital, October 27, at 10 a. m., for treatment and to stop the spread of the fever at Uptonville. The first part of the observations is taken by Dr. Guitéras at Uptonville.

Observations taken by—	Date.	Day.	Hour.	Pulse.	Temperature.	Remarks.
Dr. Guitéras	Oct. 26	First	8 a. m.	.....	102 $\frac{3}{4}$	
	26	do	8 p. m.	102	101 $\frac{1}{2}$	
	27	Second	8 a. m.	99	101 $\frac{1}{2}$	
Dr. Fagét.....	27	do	11 a. m.	80	102	Admitted in hospital.
	27	do	7 p. m.	92	102 $\frac{1}{2}$	A trace of albumen.
	28	Third	7 a. m.	86	102	
	28	do	8 p. m.	88	102 $\frac{1}{2}$	A trace of albumen.
	29	Fourth	7 a. m.	67	100 $\frac{1}{2}$	
	29	do	12 m.	68	100 $\frac{1}{2}$	More albumen by ordinary test.
	29	do	7 p. m.	70	101 $\frac{1}{2}$	
	30	Fifth	6 a. m.	54	99 $\frac{1}{2}$	
	30	do	11 a. m.	50	97 $\frac{1}{2}$	Albumen, notable quantity.
	30	do	4 p. m.	58	100 $\frac{1}{2}$	
	30	do	7 p. m.	60	100 $\frac{1}{2}$	
	31	Sixth	8 a. m.	44	98 $\frac{1}{2}$	
	31	do	3 p. m.	70	98 $\frac{1}{2}$	Sitting up in bed.
	31	do	8 p. m.	54	98 $\frac{1}{2}$	
	Nov. 1	Seventh	6 a. m.	48	97 $\frac{1}{2}$	
	1	do	12 m.	56	.....	Sitting up.
	1	do	8 p. m.	56	97 $\frac{1}{2}$	
	2	Eighth	8 a. m.	56	96 $\frac{1}{2}$	
	3	Ninth	7 a. m.	46	96	Sitting up.
	3	do	9 p. m.	52	.....	
	6	Tenth	9 p. m.	54	.....	In camp Perry.

Discharged (tenth day) November 5. Pulse very quick at death of his wife.

NOTE.—The yellow coloration of eyes and skin is well marked, and persists during convalescence.

Case No. 22.

Benjamin Upton, fifty-six years; lives in Baldwin; says he was in Jacksonville last time on 19th of August; visited Callahan, September 25, where the first case of yellow fever had occurred two weeks previous; was sick in Baldwin for a few days; left Baldwin for Uptonville, 50 miles, October 22, in a buggy; arrived at Uptonville, October 23; lay in bed, sick he thought, from fatigue; was vomiting. Seen by Dr. Guitéras at Uptonville.

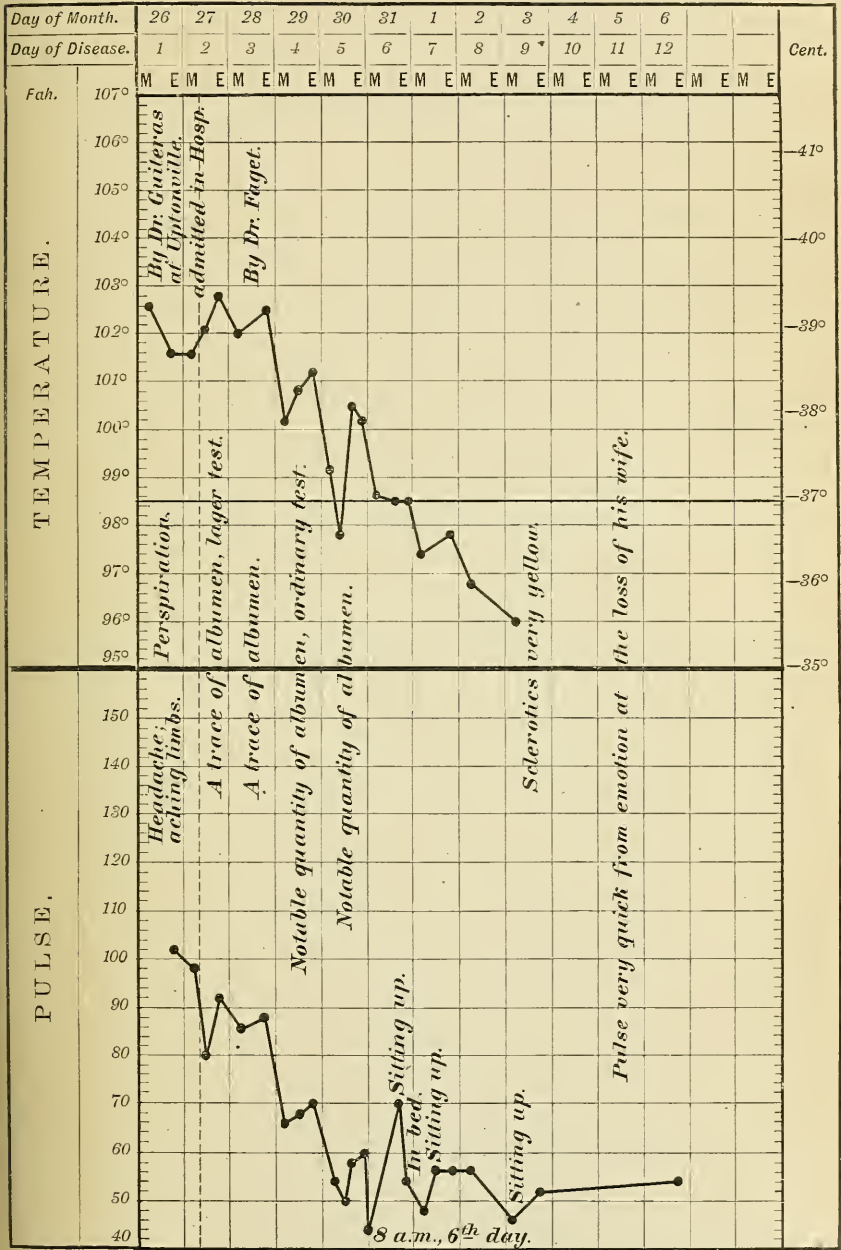
Observations made by—	Date.	Day.	Hour.	Pulse.	Temperature.	Remarks.
Dr. Fagét.....	Oct. 24	Second	8 p. m.	108	98 $\frac{3}{4}$	
	25	Third	8 a. m.	.....	99	Traces of albumen found in urine.
	26	Fourth	10 a. m.	.....	.....	No fever. Removed from Uptonville to Camp Perry Hospital.
	26	do	7 p. m.	104	99 $\frac{1}{2}$	Trace of albumen in urine.
	27	Fifth	a. m.	.....	98 $\frac{1}{2}$	
	27	do	7 p. m.	100	99 $\frac{1}{2}$	Trace of albumen.
	28	Sixth	7 a. m.	.....	98	
	28	do	8 p. m.	86	99 $\frac{1}{2}$	Trace of albumen.
	29	Seventh	8 a. m.	92	98 $\frac{1}{2}$	A faint trace,
	30	Eighth	7 p. m.	92	99 $\frac{1}{2}$	No albumen.
	Nov. 1	Ninth	8 p. m.	92	99	

Discharged November 2.

NOTE.—From October 30, no albumen was found in the urine by layer test, and the

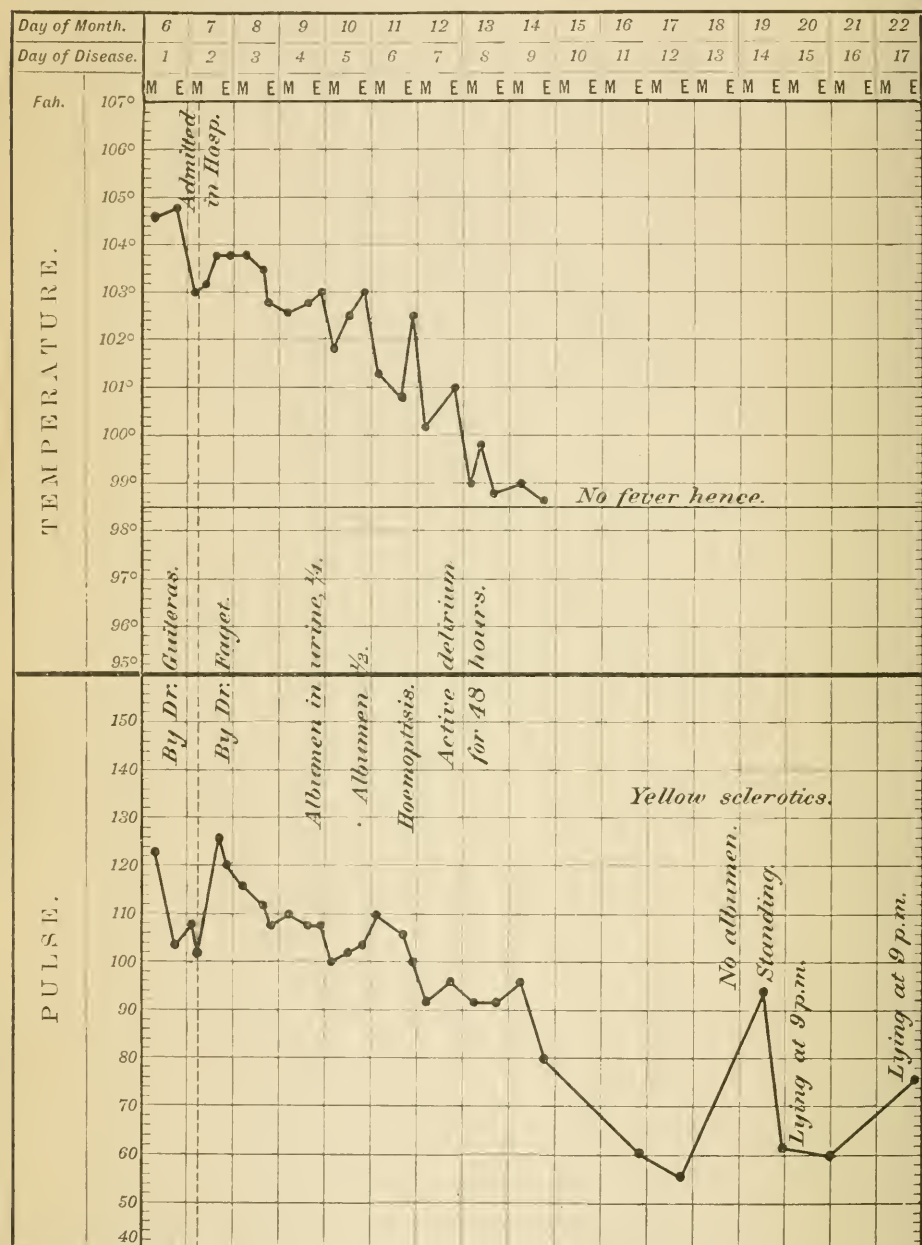
Camp Perry Hospital. epidemic of 1888 in Florida—Clinical chart, etc.—Continued.

CASE No. 21.—J. Simmons, 29 years; taken sick at Uptonville at 3 a. m., October 26, with a chill; observed by Dr. Guiteras at Uptonville on the 26th; yellow fever; transferred and admitted in Camp Perry Hospital October 27, morning; discharged November 5.



Camp Perry Hospital, epidemic of 1888 in Florida—Clinical chart, etc.—Continued.

CASE No. 23.—Wm. Herr, 18 years; left Edgewood, 4 miles from Jacksonville, October 2; passed through Jacksonville to Camp Perry; taken sick October 6, 7 a. m.; yellow fever, complicated with phthisis; admitted to hospital October 7; discharged October 27.



NOTE.—The patient coughed and spat blood for three or four days; the upper right lobe is found indurated patient's father died of consumption nine months ago, at the Sand Hills hospital; three sisters of patient had fever at Camp Perry hospital; another sister had four days of fever at Edgewood, on the St. John's river, three before leaving for Camp Perry via Jacksonville. She had been exposed in Jacksonville one week before developing the fever at Edgewood.

temperature remained normal, which leads to the conclusion that he was a convalescent from yellow fever when first observed, especially when the epidemic coincidence is taken into account. Mr. and Mrs. Simmons, cases No. 20 and 21, taken sick respectively the 26th and 27th of October, were his near neighbors, at Uptonville, and Mr. Simmons nursed him during a part of his illness.

Case No. 23.

William Herr, eighteen years; lived at Edgewood, 4 miles south of Jacksonville, on the St. John's River. Left Edgewood for Camp Perry with his family (mother and four sisters) on October 2; passing through Jacksonville. Was admitted to Camp Perry October 2. Three of his sisters were taken sick with him at Camp Perry; the other sister had had four days of fever before leaving Edgewood, having been several times in Jacksonville; the last, a week before she was taken sick. Their father had died, the last June, of consumption. William Herr was taken sick October 6 at 7 a. m. with chill; fever since. Admitted in hospital September 7.

Observations made by—	Date.	Day.	Hour.	Pulse.	Temperature.	Remarks.
Dr. Fagét.....	Oct. 6	First	7 a. m.	123	104 $\frac{3}{4}$	
	6	do	5 p. m.	104	104 $\frac{1}{2}$	
	7	Second	6 a. m.	108	103	
	7	do	7 a. m.	102	103 $\frac{1}{2}$	Admitted to hospital.
	7	do	3 p. m.	126	103 $\frac{3}{4}$	Spits blood.
	7	do	8 p. m.	120	103 $\frac{1}{2}$	
	8	Third	6 $\frac{1}{2}$ a. m.	116	103 $\frac{1}{2}$	
	8	do	3 p. m.	112	103 $\frac{1}{2}$	Delirium begins and continues fifty hours.
	8	do	8 p. m.	108	102 $\frac{4}{5}$	
	9	Fourth	7 a. m.	110	102 $\frac{2}{5}$	
	9	do	1 p. m.	108	102 $\frac{4}{5}$	Albumen; notable quantity.
	9	do	7 p. m.	108	103	
	10	Fifth	7 a. m.	100	101 $\frac{1}{2}$	Active and continuous delirium.
	10	do	12 m.	102	102 $\frac{1}{2}$	
	10	do	3 p. m.	104	103	Albumen in urine one-quarter.
	11	Sixth	7 a. m.	110	101 $\frac{2}{5}$	
	11	do	4 p. m.	106	100 $\frac{1}{2}$	Hæmoptisis.
	11	do	9 p. m.	100	102 $\frac{1}{2}$	Gums and tongue dry and bloody.
	12	Seventh	7 a. m.	92	100 $\frac{1}{2}$	
	12	do	9 p. m.	96	101	
	13	Eighth	7 a. m.	96	99	Quivering of tendons.
	13	do	9 a. m.	92	99 $\frac{1}{2}$	
	13	do	6 p. m.	92	98 $\frac{1}{2}$	Great prostration.
	14	Ninth	10 a. m.	96	99	Eyes sunken.
	14	do	6 p. m.	80	98 $\frac{3}{8}$	Albumen one-quarter.
	16	Eleventh	8 p. m.	62	.....	
	17	Twelfth	8 p. m.	56	.....	No albumen.
	19	Fourteenth	12 m.	94	.....	Standing.
	19	do	9 p. m.	62	.....	In bed.
	22	Seventeenth	9 p. m.	76	.....	In bed.

Discharged October 27 (twenty-second day).

The yellowness of eyes and complexion is well marked throughout and during convalescence. The convalescent becomes fat and recovers his strength quickly. The upper right lobe of the lung is found indurated.

Case No. 24.

Laura Herr, sixteen years. Admitted to Camp Perry, October 2. Taken sick October 5, at 8 p. m.; admitted in hospital October 7, at 7 a. m.

Observations made by—	Date.	Day.	Hour.	Pulse.	Temperature.	Remarks.
Dr. Guitéras...	Oct. 5	First	8 p. m.	96	103½	Removed to hospital.
		Second	6 a. m.	102	101½	
		do	5 p. m.	96	102½	
Dr. Fagét.....	7	Third	6 a. m.	102	100½	
	7	do	8 a. m.	104	101	
	7	do	3 p. m.	103	101½	
	7	do	6 p. m.	102	101	
	8	Fourth	7 a. m.	102	99½	
	8	do	3 p. m.	.....	.....	
	8	do	8 p. m.	.....	.....	
	9	Fifth	7 a. m.	.....	.....	
	9	do	1 p. m.	.....	.....	
	9	do	7 p. m.	.....	.....	
	10	Sixth	8 a. m.	.....	.....	
	10	do	8 p. m.			Traces of albumen.
	11	Seventh	10 a. m.	.....	.....	

Discharged, October 16 (twelfth day). Yellow coloration of eyes.

Case No. 25.

Louise Herr, twelve years. Admitted to Camp Perry October 2. Taken sick night of October 6 to 7. Admitted in hospital October 8.

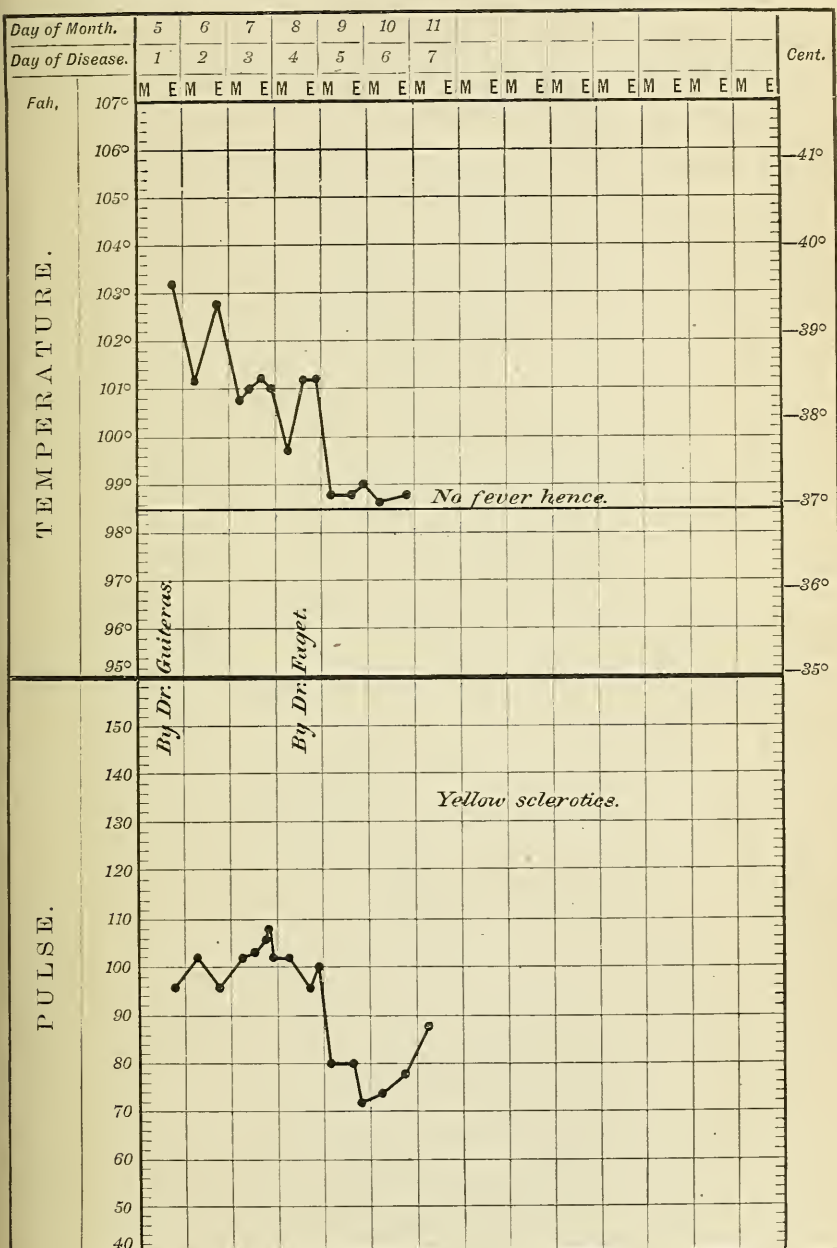
Observations made by—	Date.	Day.	Hour.	Pulse.	Temperature.	Remarks.
Dr. Guitéras...	Oct. 7	Second	a. m.	132	100½	No albumen in urine.
		do	p. m.	125	101	
		Third	6 a. m.	120	100½	
Dr. Fagét.....	8	do	8 a. m.	120	100½	
	8	do	3 p. m.	128	102	
	8	do	8 p. m.	124	101½	
	9	Fourth	7 a. m.	118	101½	
	9	do	1 p. m.	120	103½	
	9	do	7 p. m.	126	103½	
	10	Fifth	8 a. m.	124	101½	
	10	do	4 p. m.	124	102½	
	10	do	8 p. m.	116	102½	
	11	Sixth	7 a. m.	104	98	Delirium for two subsequent nights.
	11	do	4 p. m.	96	98½	
	11	do	9 p. m.	104	100½	
	12	Seventh	7 a. m.	96	99½	
	12	do	5 p. m.	76	98½	

Discharged October 23 (eighteenth day).

NOTE.—The delirium, which was most marked, seemed hysterical as there was no fever or weakness to account for it at that period from night of the 10th to the 13th.

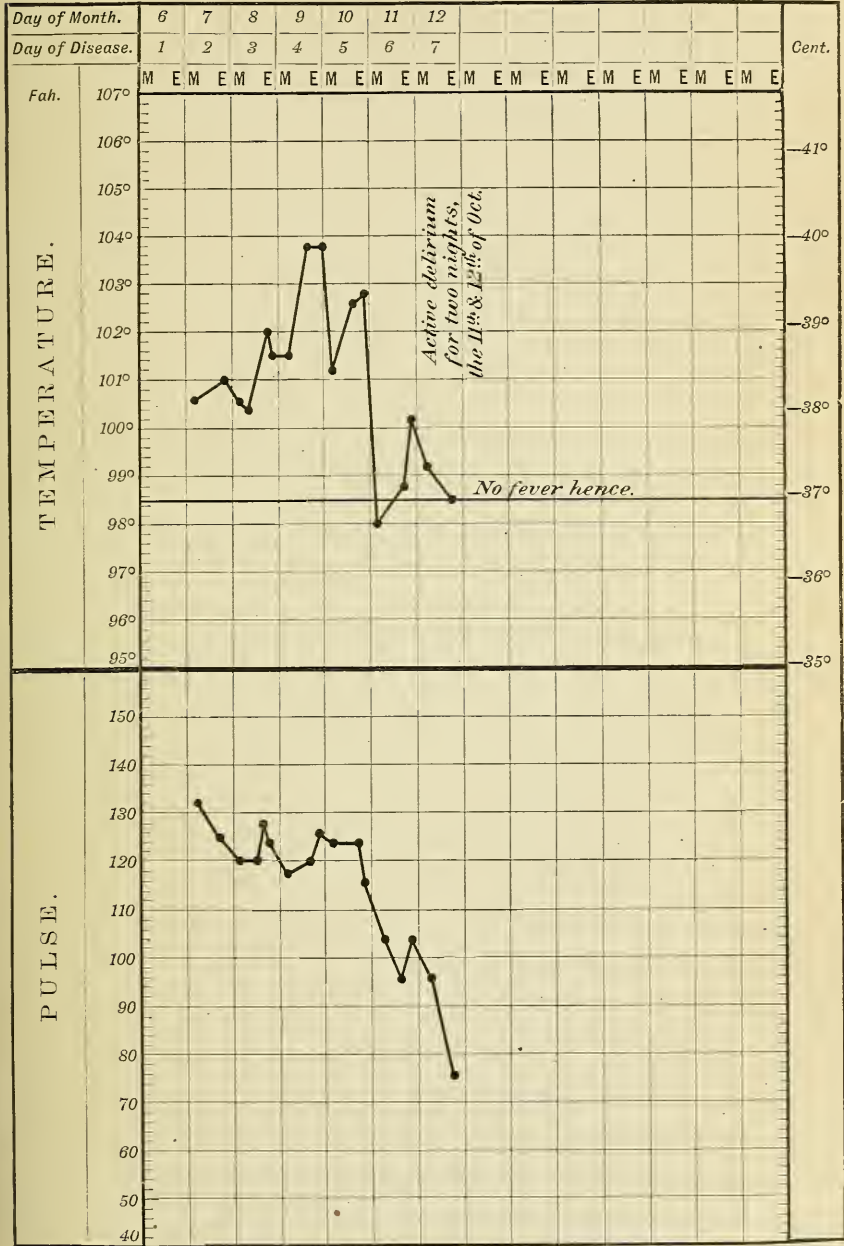
Camp Perry Hospital, epidemic of 1888 in Florida—Clinical chart, etc.—Continued.

CASE NO. 24.—Laura Herr, 16 years; left Edgewood for Camp Perry, through Jacksonville, October 2; taken sick at Camp Perry October 5, 8 p. m.; yellow fever; discharged October 16.



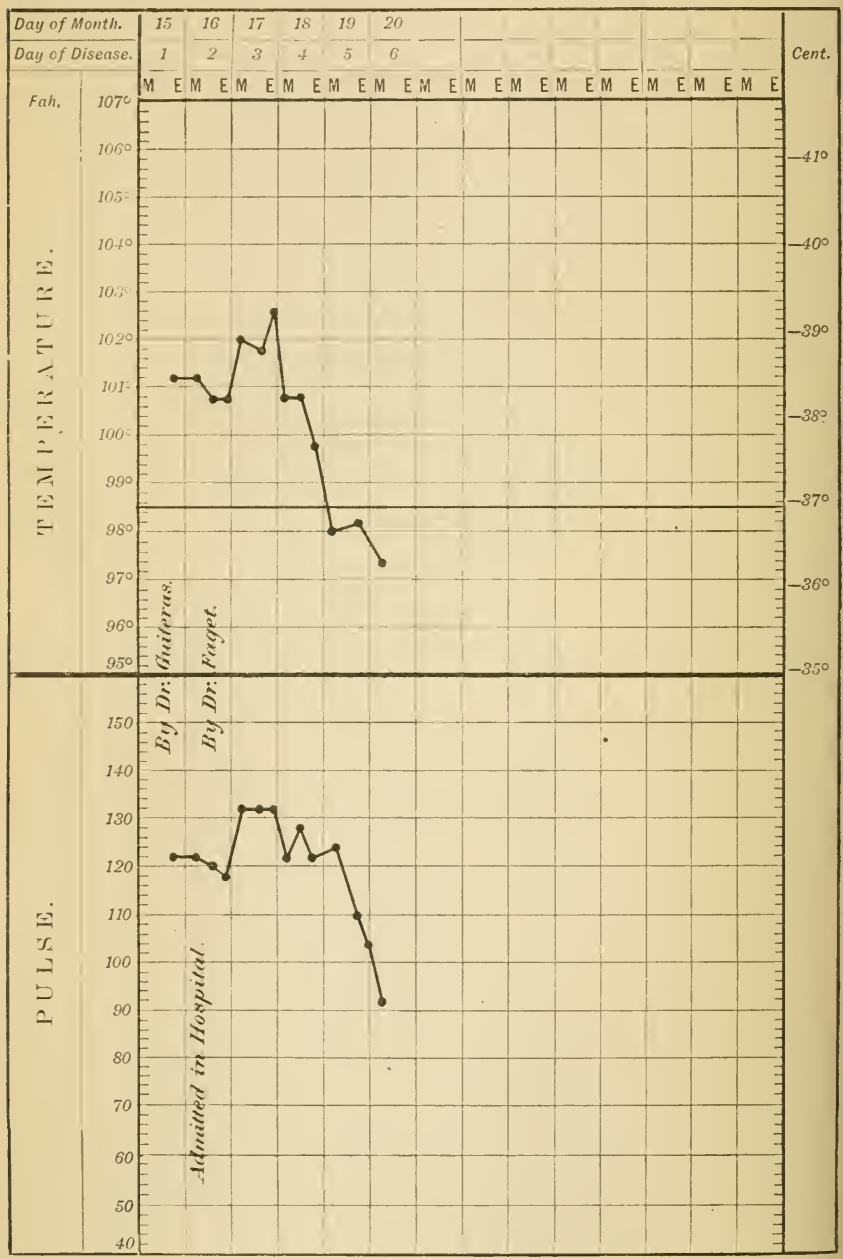
Camp Perry Hospital, epidemic of 1888 in Florida—Clinical chart, etc.—Continued.

CASE No. 25.—Louise Herr, 12 years; left Edgewood for Camp Perry, through Jacksonville, October 2; taken sick night of October 6; admitted in hospital October 8; discharged October 23.



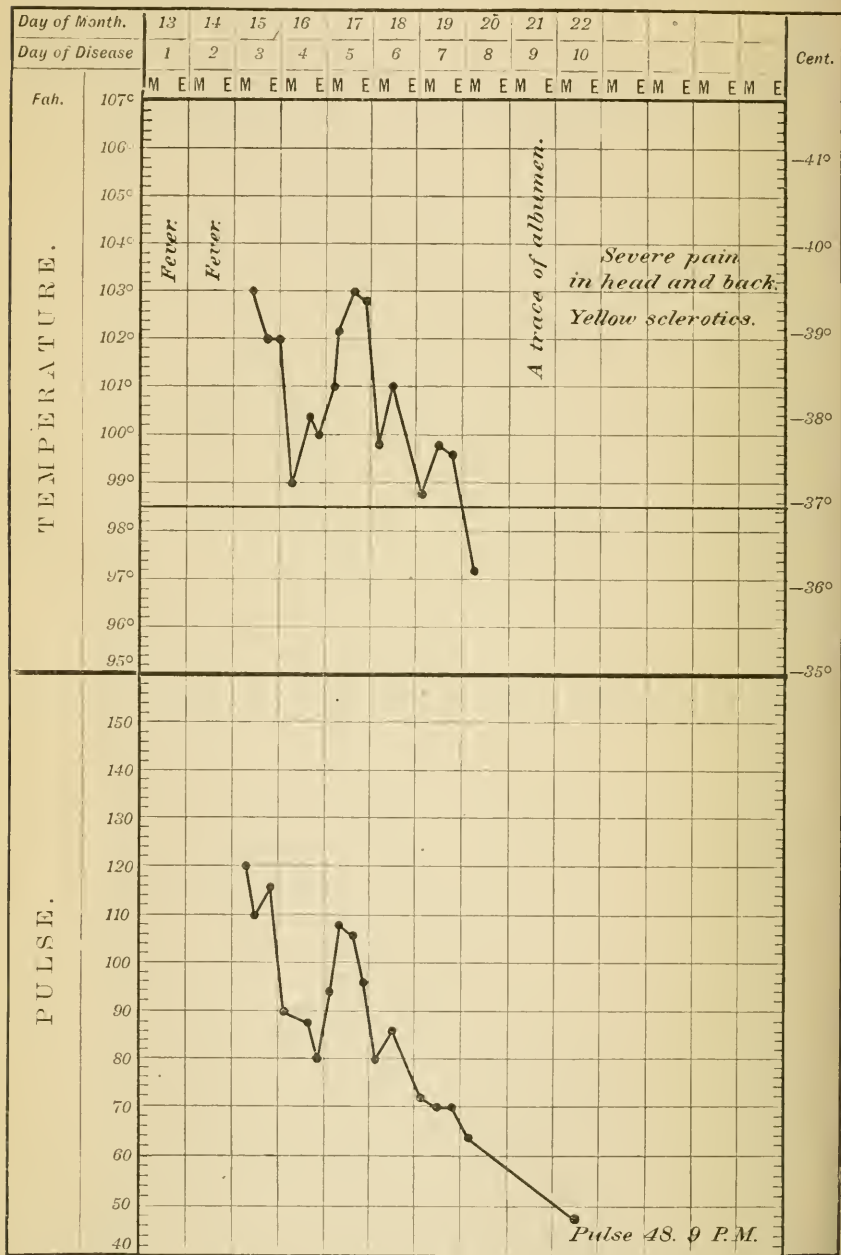
Camp Perry Hospital, epidemic of 1888 in Florida—Clinical chart, etc.—Continued.

CASE NO. 26.—Christina Herr, 8 years; arrived in Camp Perry October 2; taken sick in Camp Perry October 15; chill, fever during day, headach and fever all night; admitted in hospital October 16; yellow fever; discharged October 23.



Camp Perry Hospital, epidemic of 1888 in Florida—Clinical chart, etc.—Continued.

CASE No. 27.—R. E. Matthews, 18 years; left Callahan October 2 for Camp Perry; ten days in Camp Perry; returned to Callahan October 13, 10 a. m.; taken sick at Callahan October 13, 5 p. m.; chill, fever; second chill, 5 p. m., October 14; returned to Camp Perry and admitted in hospital October 15, 4 p. m.; yellow fever; discharged October 23.



Case No. 26.

Christina Herr, eight years. Admitted to Camp Perry October 2. Taken sick October 15. Chill, fever, severe headache. Admitted in hospital October 16. Accompanied by her mother.

Observations made by—	Date.	Day.	Hour.	Pulse.	Temperature.	Remarks.
Dr. Fagét.....	Oct. 15	First	4 p. m.	123	101 $\frac{1}{3}$	
	16	Second	a. m.	123	101 $\frac{1}{3}$	
	16	...do	3 p. m.	120	100 $\frac{1}{3}$	
	16	...do	8 p. m.	118	100 $\frac{2}{3}$	
	17	Third	7 a. m.	128	102	
	17	...do	1 p. m.	132	101 $\frac{4}{5}$	
	17	...do	8 p. m.	132	102 $\frac{2}{3}$	
	18	Fourth	8 a. m.	122	100 $\frac{2}{3}$	
	18	...do	12 m.	128	100 $\frac{2}{3}$	No albumen in urine.
	18	...do	5 p. m.	122	99 $\frac{2}{3}$	
	19	Fifth	7 a. m.	124	98	
	19	...do	3 p. m.	110	.....	Sleeping.
	19	...do	5 p. m.	104	98 $\frac{1}{3}$	
	20	Sixth	10 a. m.	92	97 $\frac{1}{2}$	

Discharged October 23 (ninth day).

NOTE.—Attention is called to the long period of incubation, apparently thirteen days. The mother was the only one in a family of six who did not contract the disease, either at Edgewood or at the hospital of Camp Perry. Four of her children developed the disease at Camp Perry; the remaining daughter had apparently had an attack of yellow fever before leaving Edgewood for Camp Perry.

Case No. 27.

R. E. Matthews, eighteen years. Left Callahan, an infected locality, October 2; was ten days in Camp Perry. Returned to Callahan October 13, in the morning; taken sick night of October 13, with chill, headache, and backache. He was removed to Camp Perry Hospital October 15, directly from Callahan, accompanied by his mother.

Observations taken by—	Date.	Day.	Hour.	Pulse.	Temperature.	Remarks.
Dr. Guitéras...	Oct. 15	Second	11 a. m.	120	103	
	15	...do	2 $\frac{1}{2}$ p. m.	110	102	
Dr. Fagét.....	15	...do	4 p. m.	116	102	Admitted to hospital from Callahan.
	16	Third	9 a. m.	90	99	
	16	...do	2 p. m.	88	100 $\frac{2}{3}$	
	16	...do	8 p. m.	80	100	
	17	Fourth	7 a. m.	94	101	
	17	...do	9 a. m.	108	102 $\frac{1}{5}$	
	17	...do	1 p. m.	106	103	
	17	...do	8 p. m.	96	102 $\frac{4}{5}$	
	18	Fifth	8 a. m.	80	99 $\frac{2}{3}$	No albumen in urine.
	18	...do	12 m.	86	101	
	19	Sixth	7 a. m.	72	98 $\frac{1}{3}$	Quinine evening and morning.
	19	...do	12 m.	70	99 $\frac{4}{5}$	
	19	...do	3 p. m.	70	99 $\frac{3}{5}$	
	20	Seventh	10 a. m.	64	97 $\frac{1}{5}$	
	22	Ninth	9 p. m.	48	.....	

Discharged October 23 (ten days sick).

Severe frontal headache and yellow coloration of eyes well marked. The mother, on the hospital grounds and with her son during that time, did not take sick. They have returned to Callahan.

Case No. 28.

W. W. Rawson, thirty-two years. A week in Callahan. Was taken sick October 26, in the afternoon, with a chill: severe headache and pains in limbs; sick stomach; profuse perspiration with fever since. Admitted directly from Callahan in hospital at Camp Perry, October 30, at 7 a. m. Yellow sclerotics and skin of a blended red and yellow hue; very bad tongue: he feels chilly and surface of body is cold.

Observations taken by—	Date.	Day.	Hour.	Pulse.	Temperature.	Remarks.
Dr. Fagét.....	Oct. 30	Fourth	8 a. m.	68	97½	Notable quantity of albumen in urine.
	30	do	1 p. m.	70	99½	
	30	do	7 p. m.	76	100½	
	31	Fifth	7 a. m.	62	98½	
	31	do	12 m.	60	.....	
	31	do	3 p. m.	70	99½	Vomiting.
	31	do	7 p. m.	70	100½	
	Nov. 1	Sixth	6 a. m.	62	97½	Vomiting several times.
	1	do	8 p. m.	58	97	
	2	Seventh	8 a. m.	48	97	
	2	do	7 p. m.	60	.....	Walking about.
	3	Eighth	7 a. m.	46	96½	
	4	Ninth	8 p. m.	55	.....	
	5	Tenth	6 a. m.	46	.....	

Discharged November 5. Yellowness of skin still well marked fourteenth day. Leaves for Callahan November 9; pulse 70.

Quinine was given several times. Four out of the six cases from Callahan appeared to me to be complicated with malaria.

Case No. 29.

J. H. Parker, nineteen years; telegraph operator. Left Tallahassee September 25, arrived at Callahan September 26; taken sick morning of September 28; chill and fever since; severe headache. Left Callahan and admitted in Camp Perry September 29, at 2 p. m.; was found to be sick October 1, at 8 a. m., by Dr. Guitéras. Admitted in hospital 9 a. m.

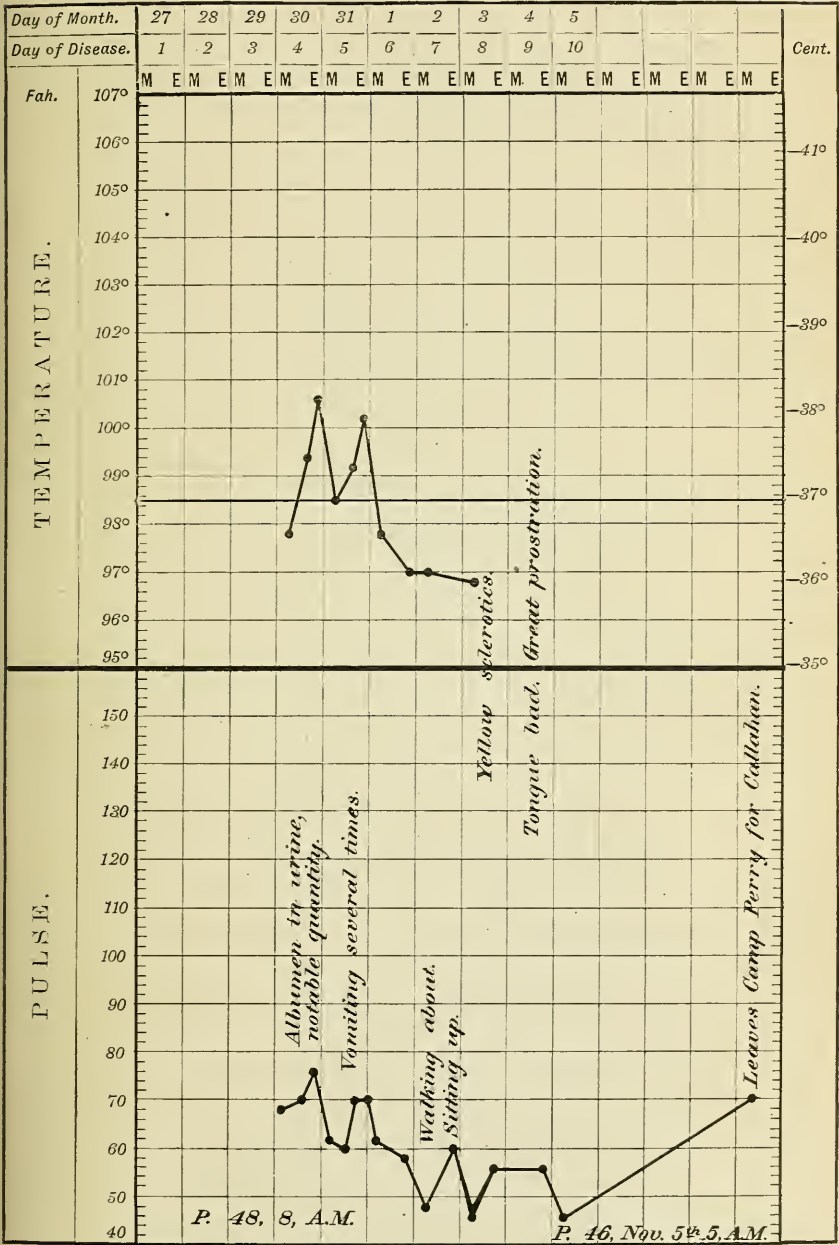
Observations taken by—	Date.	Day.	Hour.	Pulse.	Temperature.	Remarks.
Dr. Guitéras...	Oct. 1	Fourth	8 a. m.	.....	100	Albumen in urine.
Dr. Fagét.....	1	do	12 m.	96	100½	Yellow eyes and skin well marked.
	1	do	3 p. m.	96	100½	
	1	do	6 p. m.	100	101½	
	2	Fifth	6 a. m.	78	98½	
	2	do	3 p. m.	78	.....	
	3	Sixth .....	.....	.....	.....	No fever; feeling very well, takes a long walk of 2 miles.

Discharged ninth day, October 6. Returned to Callahan same day. Taken with fever October 8, at p. m.; returned to and re-admitted in Camp Perry Hospital October 9, at 4 p. m.

October 9, at 4 p. m., pulse 104; temperature 102½; bad, mixed-up complexion; 30 grains of quinine given between morning and evening. October 10, at 8 a. m., pulse 72; temperature 97½. The yellow complexion is most marked. The patient looks remarkably well and lively, and took a walk of 6 miles on the 12th. Discharged October 14, for the second time.

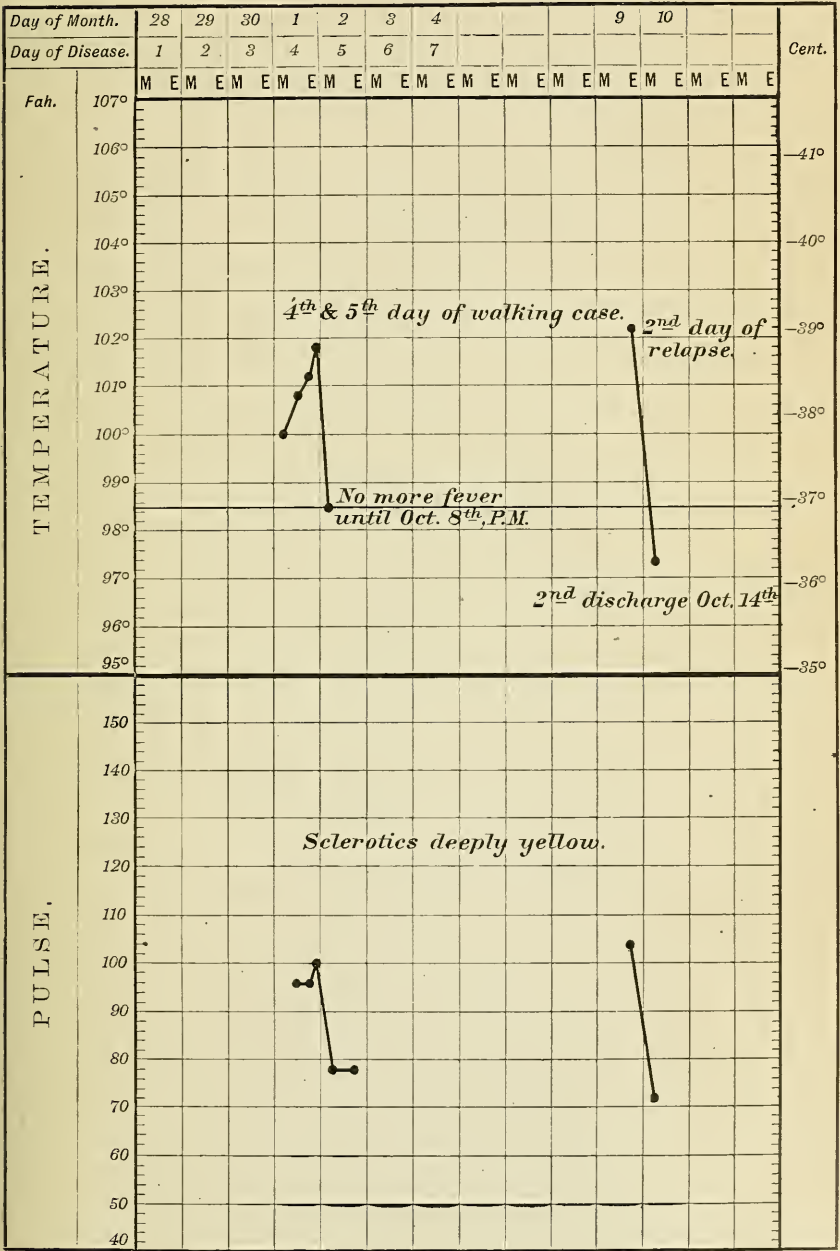
Camp Perry Hospital, epidemic of 1888 in Florida—Clinical chart, etc.—Continued.

CASE No. 28.—W. W. Rawson, 32 years; one week in Callahan; taken sick in Callahan October 26, p. m.; chill, great pains in head and limbs; left Callahan for Camp Perry 6 p. m., October 29; admitted in hospital 7 a. m., October 30; yellow fever; discharged November 5.



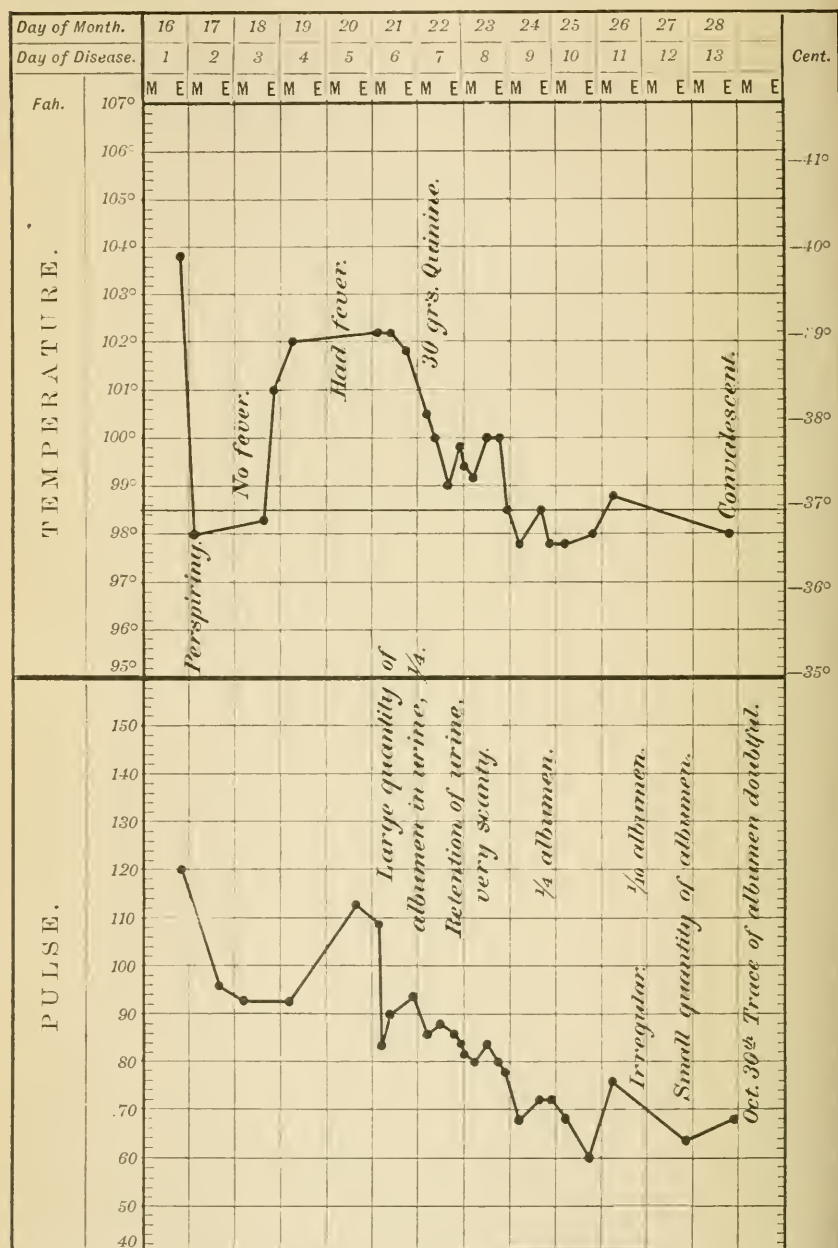
Camp Perry Hospital, epidemic of 1888 in Florida—Clinical chart, etc.—Continued.

CASE No. 29.—J. H. Parker, 19 years; telegraph operator; left Tallahassee September 25, arrived at Callahan September 26; taken sick at Callahan September 28; chill. fever since; left Callahan for Camp Perry September 29, 2 p. m.; admitted in hospital October 1; discharged October 6; returned to Callahan; re-admitted in Camp Perry Hospital October 9, p. m.; yellow fever, relapse—malarial fever.



Camp Perry Hospital, epidemic of 1888 in Florida—Clinical chart, etc.—Continued.

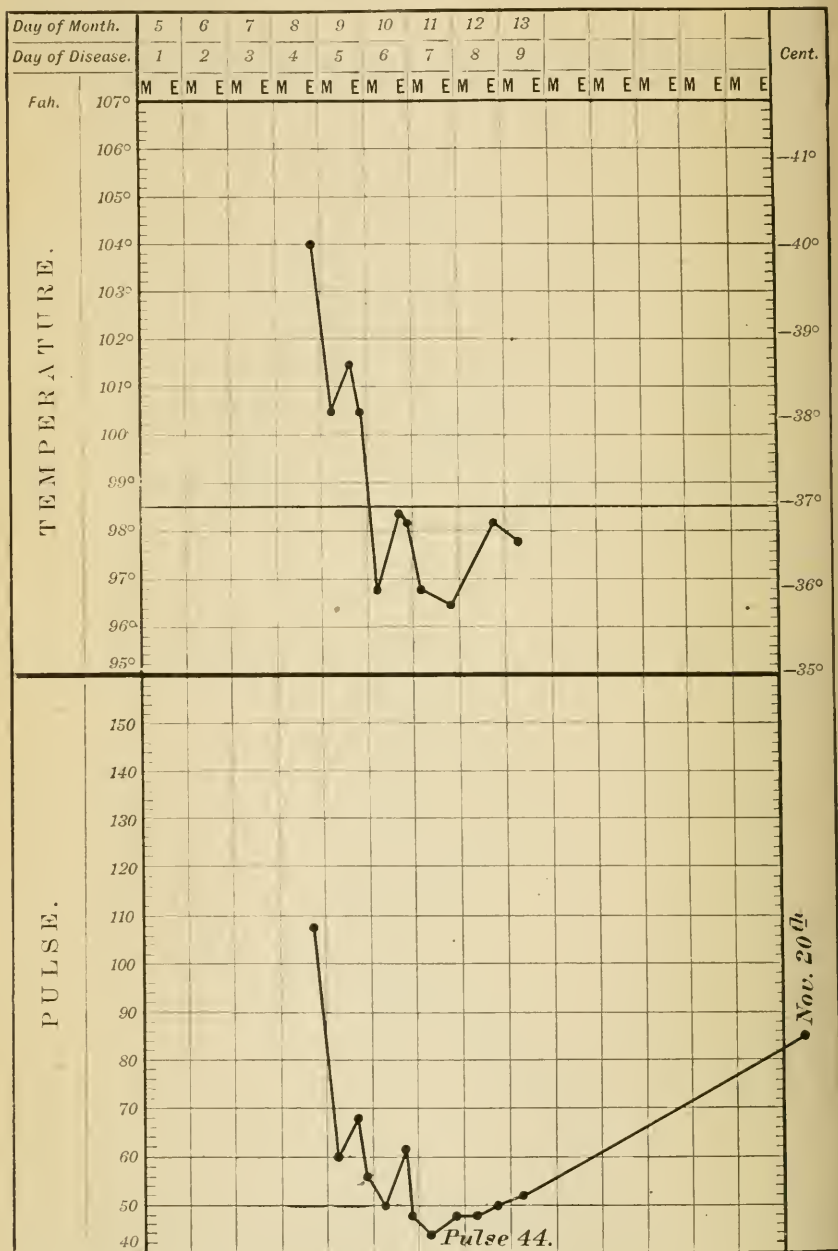
CASE No. 30.—Madison Duck (negro), 60 years; was nursing sick at Callahan; taken sick at Callahan October 16, 12 m.; left Callahan for Camp Perry October 16, 4 p. m.; chills and fever more or less since; admitted in hospital October 21, 9 a. m.; yellow fever, complicated with malaria; discharged October 30.



NOTE.—On night of the 23d of October patient looked very bad; had not urinated since the previous night; was catheterized; urine loaded with albumen. Great prostration; body felt cold; pulse irregular.

Camp Perry Hospital, epidemic of 1888, in Florida—Clinical chart, etc.—Continued.

CASE No. 31.—John German, 30 years; black; taken sick at Callahan November 5; admitted to hospital November 8; discharged November 13.



Case No. 30.

Madison Duck, sixty years; negro. Taken sick at Callahan, October 16, at 12 m. Left Callahan and admitted in Camp Perry October 16, at 4 p. m. Admitted in hospital October 21, at 9 a. m.

Observations taken by—	Date.	Day.	Hour.	Pulse.	Temperature.	Remarks.
Dr. Guitéras...	Oct. 16	First	p. m.	120	103 $\frac{3}{4}$	
	17	Second	a. m.	-----	98	Perspiration.
	18	Third	a. m.	-----	-----	No fever.
	18	do	p. m.	-----	101	
	19	Fourth	9 a. m.	93	102	
Dr. Fagét.....	20	Fifth	-----	-----	-----	No observation.
	21	Sixth	6 a. m.	84	102 $\frac{1}{2}$	Albumen in urine.
	21	do	8 a. m.	90	102 $\frac{1}{2}$	
	21	do	9 p. m.	94	101 $\frac{1}{2}$	Albumen one-fourth.
	22	Seventh	7 a. m.	86	100 $\frac{1}{2}$	Quinine.
	22	do	11 a. m.	88	100	
	22	do	4 p. m.	86	99	
	22	do	7 p. m.	84	99 $\frac{1}{2}$	
	22	do	9 p. m.	82	99 $\frac{1}{2}$	
	23	Eighth	8 a. m.	80	99 $\frac{1}{2}$	
	23	do	12 m.	84	100	Quinine given; great prostration; surface cold. Retention of urine, albumen one-third.
	23	do	5 p. m.	80	100	
	23	do	9 p. m.	78	98 $\frac{1}{2}$	
	24	Ninth	7 a. m.	68	97 $\frac{1}{2}$	
	24	do	4 p. m.	72	98 $\frac{1}{2}$	Albumen one-fourth.
	24	do	9 p. m.	72	97 $\frac{1}{2}$	
	25	Tenth	7 a. m.	68	97 $\frac{1}{2}$	
	25	do	8 p. m.	60	98	
	26	Eleventh	7 a. m.	76	98 $\frac{1}{2}$	Albumen one-tenth.
	27	Twelfth	7 p. m.	64	-----	Irregular.
	28	Thirteenth	9 p. m.	68	98	A trace of albumen (layer test).
	30	Fifteenth	-----	-----	-----	Doubtful trace of albumen.

Discharged October 30 (fifteen days sick).

The patient was very sick on the 22d and 23d; appeared to be sinking the night of October 23; utmost prostration; retention of urine since preceding night; drawn urine loaded with albumen; a full glass of champagne acted very well at that time.

NOTE.—My opinion is that the case was ushered in by malaria on the 16th, and developed into yellow fever on the 19th or 21st.

Case No. 31.

John German; thirty years; black. Taken sick at Callahan November 5 at 9 a. m. Removed to Camp Perry Hospital November 8.

Observations taken by—	Date.	Day.	Hour.	Pulse.	Temperature.	Remarks.
Dr. Guitéras...	Nov. 8	Fourth	5 p. m.	108	104	
	9	Fifth	6 a. m.	60	100 $\frac{1}{2}$	
Dr. Fagét.....	9	do	2 p. m.	68	101 $\frac{1}{2}$	
	9	do	8 p. m.	56-60	100 $\frac{1}{2}$	Irregular.
	10	Sixth	7 a. m.	50	96 $\frac{1}{2}$	
	10	do	1 p. m.	62	98 $\frac{1}{2}$	
	10	do	8 p. m.	48	98 $\frac{1}{2}$	Traces of albumen.
	11	Seventh	6 a. m.	44	96 $\frac{1}{2}$	
	11	do	9 p. m.	48	96 $\frac{1}{2}$	
	12	Eighth	7 a. m.	48	-----	Sitting up.
	12	do	7 p. m.	50	98 $\frac{1}{2}$	
	13	Ninth	8 a. m.	52	97 $\frac{1}{2}$	
	17	Thirteenth	8 a. m.	58	-----	

Discharged November 13.

NOTE.—Attention is called to the disproportion between pulse 56 and temperature 100½ on the 9th.

Case No. 32.

Washington Lafton; twenty-six years; black. Lives a quarter of a mile from Cal-lahan. Taken sick night of November 6. Removed to Camp Perry Hospital November 8.

Observations taken by—	Date.	Day.	Hour.	Pulse.	Temperature.	Remarks.
Dr. Guitéras...	Nov. 8	Second	5 p. m.	78	103	
		Third	6 a. m.	80	102	
Dr. Fagét.....	9	do	2 p. m.	76	100	
		do	8 p. m.	66	99	
		Fourth	7 a. m.	65	98½	Vomiting several times.
		do	1 p. m.	70	99½	
		do	8 p. m.	61	100	
		Fifth	10 a. m.	58	98½	Trace of albumen in urine.
		do	2 p. m.	60	101½	
		do	9 p. m.	59	99½	
		Sixth	7 a. m.	56	98½	
		do	7 p. m.	64	98½	Sitting up.
		Seventh	8 a. m.	76	97½	
		do	9 a. m.	68	.....	

Discharged November 13.

Both cases were very weak; yellowness of eyes well marked.

Note the disparity between pulse and temperature November 11.

Case No. 33 (intermittent fever).

Emily Williams; twenty-five years; black; washerwoman at Camp Perry. Arrived from Jacksonville at Camp Perry September 11; taken sick September 19. Fever begins every day at noon to leave her at night. Admitted in hospital September 23 for better accommodations.

Observations taken by—	Date.	Day.	Hour.	Pulse.	Temperature.	Remarks.
Dr. Fagét	Sept. 23	Fifth	12 m.	84	99½	Large dose of quinine.
	23	do	4 p. m.	84	99½	
	23	do	9 p. m.	76	98½	

Discharged September 25; very well.

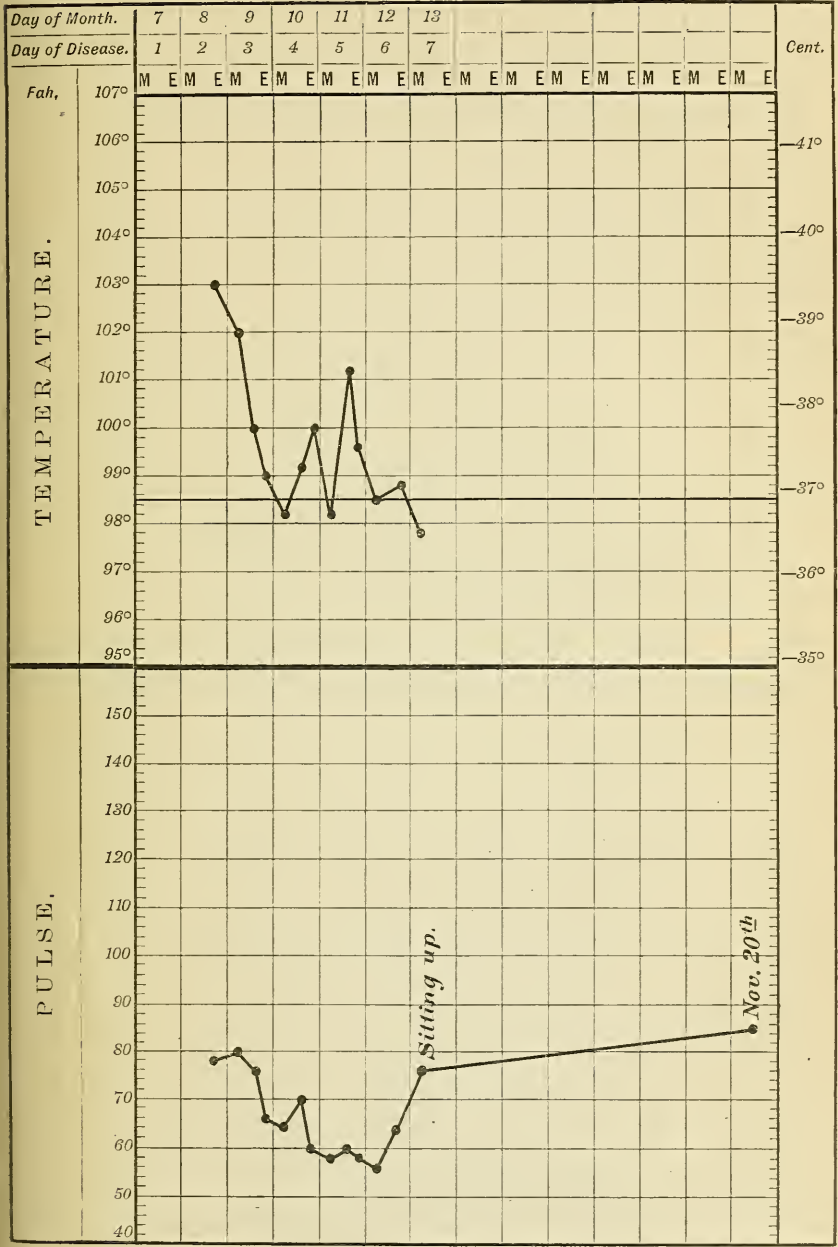
Case No. 34 (intermittent fever).

E. H. Hunter; thirty-seven years; white; carpenter at Camp Perry Hospital since September 9. Had chills and fever two weeks before; has diarrhœa and vomits often since September 11; taken sick September 24, evening.

Observations taken by—	Date.	Day.	Hour.	Pulse.	Temperature.	Remarks.
Dr. Fagét.....	Sept. 24	First	p. m.	108	102	Pale and anæmic.
	25	Second	a. m.	.....	101	
	25	do	9½ a. m.	74	98	Thirty grains quinine.

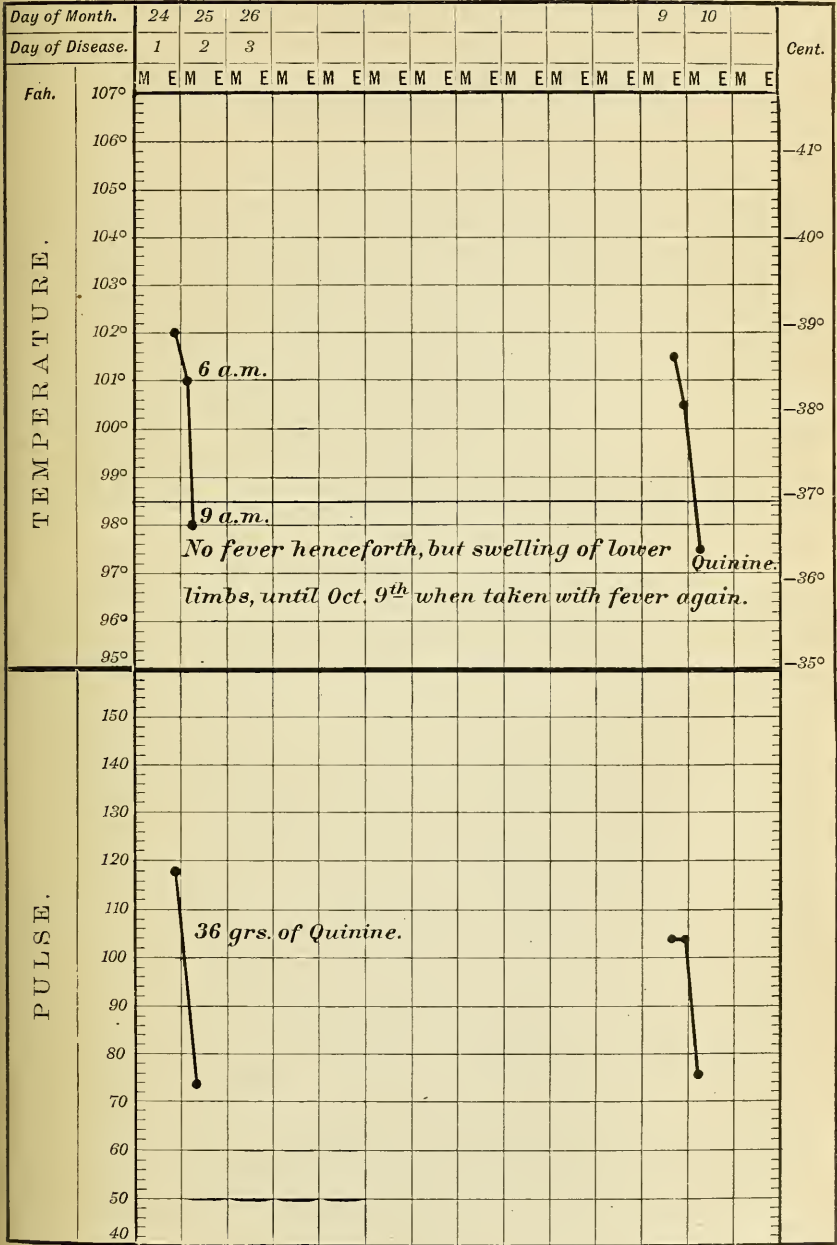
Camp Perry Hospital, epidemic of 1888 in Florida—Clinical chart, etc.—Continued.

CASE No. 32.—Washington Lafton, 26 years; black; taken sick at Callahan night of November 6; yellow fever (light case); admitted to hospital November 8.



Camp Perry Hospital, epidemic of 1888 in Florida—Clinical chart, etc.—Continued.

CASE NO. 34.—E. H. Hunter, 40 years old; carpenter, employed at Camp Perry Hospital since September 9; had chills and fever two weeks before at Savannah; diarrhoea and vomiting since September 11; malarial fever; taken sick with fever September 24, p. m.; discharged October 15.



No fever from that time until October 9, fifteen days after, but the face and lower limbs have been swollen from anæmia.

Observations taken by—	Date.	Day.	Hour.	Pulse.	Temperature.	Remarks.
Dr. Fagét.....	Oct. 9	First	2 p. m.	104	101½	Twenty to 30 grains quinine.
	9	...do	8 p. m.	104	100½	
	10	Second	10 a. m.	76	97½	

No fever henceforth. Discharged October 15, much better in every respect and growing fat.

NOTE.—This is the only case of sickness among the nine employés who were on the hospital grounds. Five of these had never had yellow fever. Besides, four adults and two children and two babies (who were at the hospital during the sickness of their parents) did not contract the disease during their stay nor after, as far as could be learned. They were Raphael Villano, Mrs. Matthews, Tyler, and Herr, a child of Mrs. Macroon, and three children of Mr. and Mrs. Simmons, the cases Nos. 20 and 21.

The only suspicion that the grounds might have become infected was the finding on the 23d of October and 9th of November, respectively, of two little pigs who had died on the grounds. On being opened, the liver of both was the identical liver of yellow fever; the hearts and kidneys were also found degenerated, very pale, and yellow. Only a small portion of the heart had kept its normal color; no black vomit in stomach; no other pathological changes were found to account for death.

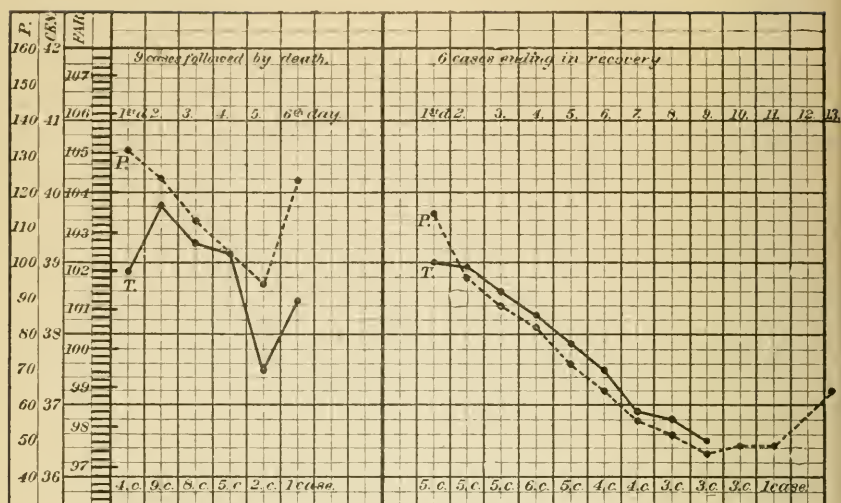
REMARKS.

If I did not have during this epidemic as many cases as I might have wished, for observations, I have therefore observed these few more closely, living with them hourly, as it were. The course of the fever was not as characteristic as I have observed it in several epidemics in New Orleans and at the city hospital of Vicksburg in 1878.

The typical course of this fever is a want of correlation or correspondence between the course of the pulse and temperature; the temperature rising or keeping up for one or two days, rarely three or four, with an ordinary decrease in the mornings, while the pulse decreases in number from the very first day to the second, and so on, with an exceptional or insignificant rise in the evenings, and continues to decrease in convalescence, falling below the normal, to 58, 50, 44, and in rare instances to 40 a minute, which is, as it were, the signature of yellow fever, if any doubt had existed previously about the diagnosis. The low range of the pulse during the whole course of this fever, as compared with the corresponding temperature, and during the prostration of convalescence, when the pulse would be expected to be quick, as after fevers in general, is also a most remarkable fact.

I will cite as examples of this course the cases of Dombrock, J. Simmons, Burritt, and the double case of Barber for the pulse and temperature, and that of Dr. Posey for the pulse, which did not correspond with (for yellow fever) the considerable remissions of the two first days.

To show the course of this fever, and for the sake of comparison, allow me to introduce here a chart, which was published in my Thesis of 1880, in Paris, of the mean pulse and temperature of nine cases followed by death and six by recovery—all the cases observed in one small locality in the vicinity of Vicksburg in 1878, where no other fever but yellow fever existed at the time:



Also the table of the mean pulse of four hundred cases observed by Blair in British Guiana, although he does not call attention to this law of the decrease of the pulse implied in these facts :

Days.	Pulse.	Days.	Pulse.
First	97	Eighth.....	75
Second.....	90	Ninth.....	75
Third.....	83	Tenth.....	77
Fourth.....	80	Eleventh.....	76
Fifth.....	78	Twelfth.....	76
Sixth.....	78	Thirteenth.....	79
Seventh.....	78		

Also the mean pulse and temperature of thirty cases observed at New Orleans in 1870, published by my father, Dr. J. C. Fagét, in 1873, in the *New Orleans Medical Journal*. In a pamphlet published in 1859 he took as a basis one hundred and forty-seven observations to establish this general fact of the regular decrease of the pulse in yellow fever. In a pamphlet published in 1875, "Type and Specificity of Yellow Fever," he also gives a medium of seventy-three cases observed by Dr. D. D. Saunders during the epidemic of 1873 at Memphis, published in the *New Orleans Medical Journal* of May, 1874.

I add the mean pulse and temperature of two hundred and thirteen observations taken by myself among about five hundred cases observed in the hospital and vicinity of Vicksburg in 1878. The observations were taken without choice, and all were included.

Day.	Thirty cases, New Orleans (1870).		Seventy-three cases, Memphis (1873).		Two hundred and thirteen cases, Vicksburg (1878).	
	Pulse.	Temperature.	Pulse.	Temperature.	Pulse.	Temperature.
First	113	39.8	114	39.2	106	39.1
Second	102	39.8	112	39.1	94	39
Third	90	39	107	39	90	38.4
Fourth	84	38.8	96	39	84	37.5
Fifth	76	38.3	86	39	80	37.3
Sixth	72	38	74	38.6	80	36.9
Seventh	67	37.9	69	37.5	78	37.2
Eighth		37.8	68	37.2	79	36.6
Ninth		37.5	64	36.6	73	37.3
Tenth			65	36.7	72	
Eleventh			67	36.7	88	
Twelfth			71	36.7		
Thirteenth			80	36.9		
Fourteenth			82	36.9		

These media, from the eighth day, do not give a correct idea of the pulse, because the observations are contained mostly in these few cases where the fever is prolonged with a relatively quick pulse. If these observations had been continued in as many cases as were observed the first days, these media would show a much lower pulse.

THEORY OF PATHOLOGY.

I believe this peculiar effect of yellow fever on the pulse can be ascribed to the general pathological process, which is, like that of phosphorus poisoning, an acute fatty degeneration of all the tissues; this degeneration affecting the heart's action, either through the degeneration of the muscular fibers or of the nervous centers. To this degeneration can also be ascribed the capillary stasis, the rapid extravasations after death, the tendency to hemorrhages in general, but particularly from the mucous membranes of the mouth and stomach. The fatty degeneration of the mucous membrane of the stomach has been demonstrated by Chaveaux, of French Guiana. The early appearance of albumen in the urine, so common in this fever, if properly sought for by the layer test, as Dr. Guit  ras has had the kindness to show me to be present, even in light cases, and so rare or late in other grave fevers, that it is a most important sign for the early diagnosis of this fever—and the suppression of urine—can also be ascribed to the acute fatty degeneration of the kidneys (tubuli and corpuscles of Malpighi) as in the large fatty kidney.

To the rapid fatty degeneration of the liver I would attribute the early yellow suffusion of the eyes, also important for the early diagnosis, as it makes its appearance sometimes from the first day. This yellowness, extending often to the skin and tissues of the body, which has given the disease its name, is peculiar, of a pale hue—light straw—if deep, turning to mahogany, bronzed, not to the greenish yellow of ordinary jaundice, which is so early and constant in grave cases; always making its appearance after death, if it had not been noticed previously and intensifying itself so rapidly that it is a wonderful phenomenon, to see it grow on a body changing into mahogany with the black extravasations. This yellowness is not due, in my opinion, directly to a retention and diffusion in the tissues of already constituted bile, but to effete blood changes which would be transformed and excreted as bile if the functions of the liver were normal. It may be compared to the yellowness following a "black eye," and may be analogous to it in its constituents and metamorphoses. I would therefore ascribe this yellowness to the gradual and immediate diminution, complete suppression in fatal cases (explaining the rapidly intensifying yellowness at death), of the bilious secretory action of the liver, the acute fatty degeneration of which is so surprising in its rapidity and the most characteristic *post mortem* lesion in yellow fever, with a similar lesion of the kidneys; both

organs congested and bright yellow in their entirety, or in patches more or less extended, according to the rapidity of the fatal termination.

The gall-bladder is, as a rule, found empty; and if it be found to contain bile, in some instances, it does not prove that the secretory action of the liver was not suspended. This bile might have been secreted and retained in the gall-bladder for a long time prior to the suppression of the functions of the liver and consequent death.

The same is true about the suppression of urine, the generally recognized harbinger of death, which is very often preceded, in my experience, by retention. If the precaution has been taken to relieve the bladder, twelve or twenty-four hours before death, the bladder is found empty after death; if this precaution has not been taken and the bladder is found full, it does not prove that the urine had not accumulated there, twelve, twenty-four, or forty-eight hours before suppression set in.

Has it not been noticed that the supervention of black vomit is generally coincident with the suppression of urine? Is not the suppression of the functions of the liver concomitant with that of the kidneys? Both organs are found as much degenerated the one as the other. Has not this disorganization of the liver as its natural sequel, as in acute cirrhosis, the loaded state of the portal system, noted by Dr. Joseph Jones, I believe; consequently the turgid state of the capillaries of the mucous membrane of the stomach; the increased acidities of the secretion of that organ; acidities, connected with fatty degeneration in general; vicarious of the secretions of the liver and kidneys, doing away with the effete products of this fever which would otherwise have been excreted through their natural channels as bile or urine? With these acids corroding the already degenerated mucous surfaces of the stomach, too ready to bleed, as the other mucous membranes, especially in the dependant part, the great *cul-de-sac*, where the acid liquids accumulate and where the lesion is found most marked, in a high state of congestion and red points from which the blood has oozed out, and the foregoing turgid state from the portal stasis, have we not an abundant explanation of the supervention of black vomit, the occurrence of which is so much the rule in bad and almost all fatal cases of yellow fever (*Vómito prieto*), and comparatively so rare in other fevers, that it is a strong presumptive evidence of the disease? However, it has been observed in malarial fevers where there were no possibilities of yellow fever, and I have observed, with my father, a genuine case of black vomit, confirmed by the microscope, in a fatal case of small-pox, where the mucous membrane of the stomach and duodenum was found studded with a crop of eruptions or enlarged glands.

To demonstrate this action of the acids of the stomach in causing the natural color of blood to turn black, as it oozes in minute drops from the mucous surface of the stomach, I will cite an instance which occurred under the eyes of my father. A child had vomited a clear, intensely acid liquid in a vessel; it started immediately thereon to bleed from the nose over the vessel, and as the blood dropped into the liquid it instantly turned black, forming a typical specimen of black vomit (coffee ground dregs, flies' wings). Who has not seen the black vomit preceded or followed by the vomiting of red blood, according to the degree of acidity of the stomach, or, especially, when the hæmatemesis was abundant; or seen it mixed, red and black, or small black spots showing the red hue of blood when crushed or spread on white cloth? Is it possible to ignore what it is! Is it not the same as in cancer, cirrhosis, and other diseases?

THEORY OF TREATMENT.

As, therefore, all the symptoms common with those of phosphorus poisoning (black vomit, albumen in the urine, low pulse, jaundice), and all the danger in this fever, seem to arise from the acute fatty degeneration of the vital organs, impairing their normal functions, and finally suppressing them, is the remedy to be sought, to be directed to the arrest of fatty degeneration, or to the arrest of the rapid breaking down of the normal tissues constituting the acini, tubuli, and so forth? In this degeneration of the organs, does not the fat of more simple organization simply replace

the more highly organized tissues, *pari passu* with their disintegration? Has the specific poison of yellow-fever an elective action on the nervous centers presiding over the reconstruction of these tissues, or has this poison and that of phosphorus a greater disorganizing action on these tissues, or on certain elements of the blood, as the fibrine or hæmatoglobine, on which these tissues may build, than on fat, thereby famishing them? What a beautiful study for the physiologist and organic chemist! If the foregoing be true, should we not try to supply the blood with the elements the enemy preys upon, thereby economizing them, until the disease has run its limited course, as the Russian peasant, pursued by wolves, dropping his children from his sleigh, one after another, to save his own life; in one word, to feed the patient, and with albuminoids?

PRACTICAL TREATMENT.

It seems to me to be more difficult to say what to do in yellow-fever than what not to do. As this disease has a tendency to rapid asthenia from the beginning, anything which would tend to weaken the patient should be carefully avoided. The direful effects of bleeding have been demonstrated. This treatment has been happily abandoned in this disease. A reserve, however, should be made in favor of bleeding in the *very* few sthenic cases, with a temperature above 105, where bleeding might be the only means of saving life. Purging, with the idea of driving the microbes from the alimentary canal, is still practiced extensively. Do not the symptoms and pathological anatomy prove that the whole system is affected? And what proof is there that it is affected through a different process—through the ptomaines—the alimentary canal alone containing the original cause of all the subsequent general disturbances? And, in infected localities, is there not a constantly renewed supply of the specific cause before, during, and after the attack? Is the patient benefited by a removal to a non-infected place? When once the course of specific disturbances, which is self-limited, has been started, I believe it is useless and dangerous to try to destroy or expel its specific cause from the system. Overheating with blankets and hot applications tends to increase the fever, and by inducing excessive perspiration exhausts the patient. He can certainly do as well without these interferences, and be more comfortable altogether. I would also distrust anything tending to irritate the stomach, as repeated doses of bi-chloride (tending also to asthenia and disorganization), calomel, castor oil, turpentine in large doses, although I was tempted to experiment with turpentine as a diuretic, or as a styptic, in black vomit, and through an obscure idea that as it is the recognized antidote for phosphorus poisoning, its theoretical action not being clearly understood, it might also be beneficial in yellow-fever. It has been employed in large doses by other physicians, but not with any decided result, as I understand. Besides, is a diuretic needed, and is it not dangerous, outside of milk or water in abundance, in this acutely degenerated and congested condition of the kidneys? Lastly, *beware of starvation*.

The general plan of treatment, in my opinion, should be: Make your patient *comfortable* and keep up his strength by proper alimentation, and you will have as good a proportion of recoveries as by any other treatment howsoever varied. Happily, the greater proportion of cases will recover in spite of the most irrational forms of treatment. These cases, however, are prolonged and subject to much suffering. A certain proportion, which varies greatly in different epidemics, and this one has been one of the most mild, will die, notwithstanding the best treatment; it is evident from the first visit that nothing can save them. But, evidently, there is a small proportion of cases where a judicious or reckless treatment, even in the smallest detail, will make all the difference between a happy or fatal termination. It can be easily understood how chance plays a considerable part in the unequal distribution of these different classes of cases, and how deceptive statistics may be about the treatment which seems to have been most successful. This is especially true when the statistics are founded on small groups of cases occurring in different years and in very dif-

ferent conditions. One physician will not count, in his numbers, the cases that were moribund or beyond hope at his first visit (a question answered after the result), or those which died on his hands and had been previously treated by another physician, but will count the other cases—of recoveries. Another physician will send to the hospital, off his hands, for better accommodations, his patients, wherever feasible, as soon as black vomit, active delirium, or suppression sets in. One or two physicians doing this will change the statistics of the hospital and their own. At the city hospital of Vicksburg, in 1878, of eighty-eight deaths fifteen were sent moribund to the hospital and died the same day, and twenty-eight from the first to the third day. The best treatment can not be found through statistics as they are made, but through judgment and experience.

The most difficult and important part of the treatment, I believe, is to attend to the careful feeding of the patient. An abundance of milk with bicarbonate of soda or lime water to correct the tendency to acid secretions and vomiting, to be continued as long as the fever is high, one or two days; then, as soon as it diminishes, unless it be prolonged indefinitely, chicken or beef broth, a couple of soft-boiled eggs, with a little toast; then, when the temperature is about 100 or below, and increasing the food rapidly with convalescence, pieces of chicken or very tender meat, steak or chop, meat juice, beef tea, soup, jellies, but milk and soft-boiled eggs are the most prudent form of food throughout; use sparingly of sugar, bread stuffs, fat, for fear of inducing sourness of the stomach. A French preparation of great reputation, the "Elixir Ducer6"—meat juice in good brandy aromatized—I have found very useful; it is palatable and well borne by the stomach in constant vomiting. Wines, early in convalescence, but I am a little diffident about the use of stimulants during the fever, as tending to produce sourness of the stomach and vomiting, and congestion of the kidneys. But I have found a glass of champagne to have an admirable effect in the stage of prostration which is sometimes so dangerous, with cold surfaces, the patient sinking and threatening heart failure.

As symptomatic medicines, I have found antipyrin in doses of 10 to 15 grains to reduce high temperatures and to allay the nervous pains of the head, back, and limbs. I have not yet observed any decided bad effects from its use, the pulse sometimes becoming a little irregular and weaker. The liniment, of equal parts of camphor and chloral (2 ounces each with 15 grains of atropine added), is also very good to relieve rapidly the neuralgic pains. The pain in the orbits and supraorbital regions is a remarkable feature of yellow fever in its localization, also that in the pit of the stomach and about the navel. Calcined magnesia (Husband's) as an antacid or as laxative, to relieve the bowels once, if found overloaded. Cold water affusions in active delirium; mustard to the epigastrium in repeated vomiting; turpentine stupes on the back for pain, or in suppression of urine; in black vomit, a strong solution of tincture of iron. In four cases of black vomit, at Vicksburg, in which I gave it in large doses, on account of the profuse hemorrhage, and the only cases of black vomit in which I gave it, the four cases recovered. I have given to every case this year 10 to 20 minims of the tincture of the muriate of iron in glycerine and water four times a day. It had no bad effect on any, and rather appeared to stop the vomiting. Of the two cases which terminated fatally, one was a malignant case and was only two days at the hospital; the other objected to take the medicine, so both took very little of it.

It is good to have a standard medicine to give throughout this disease; the patient feels that he is treated. This medicine is certainly not harmful, and in the experience of the masters in the profession it is found to be the best remedy in asthenic diseases, such as erysipelas, and especially in diphtheria, both locally and internally. Muriatic acid is recommended in typhoid fever almost as a specific. Why not the muriate of iron? Might not its happy effects in zymotic or infectious diseases be ascribed to its being a chloride, even through its iron does it not help in the reconstruction of blood or stay its disorganization? Certainly it is a good remedy in yellow fever, which has, furthermore, such a tendency to hemorrhages (of the gums, stomach,

etc.); from the outset its astringent effect on the mucous membranes of the stomach might tend to prevent the oozing of blood (black vomit) and stop the vomiting. Its acid reaction is its only objection. Besides the muriate tincture of iron, the medicine which I believe most important in the treatment of yellow fever is quinine, which should be exhibited whenever there is the least suspicion of a malarial complication. When yellow fever is recognized, the possibility of the intervention of another fever is not generally suspected. A clear case of intermittent fever supervening during the convalescence of yellow fever is called a relapse; the remedy is not applied, and an unfortunate result may be the consequence. I believe that the presence of either of these fevers, instead of being an obstacle to the appearance of the other is very often—not the rule, however—the determining cause of the breaking out of the other disturbance.

Quinine, if not useful in uncomplicated yellow fever, is not dangerous unless given in enormous and repeated doses.

PREVENTION OF SPREAD.

Allow me, in closing this report, to make a suggestion about one of the means which could be experimented on for the arrest of the spread of yellow fever when once introduced in a locality: the use of liquid or compressed ammonia, which by its two-fold effects of inducing cold, and its being one of the best germicidal agents, according to the bacteriologists, would, in my opinion, be the best disinfectant for this purpose, and one of the cheapest. Great care, however, would be necessary in its application.

Very respectfully,

C. FAGÉT, M. D.

The SUPERVISING SURGEON-GENERAL,

U. S. Marine-Hospital Service, Washington, D. C.

(Dr. J. H. Caldwell has graciously offered me his charts of pulse and temperature, taken in St. Luke's Hospital, at Jacksonville, during this epidemic. If it be deemed proper, they could be introduced here to serve as a comparison with the observations taken at the hospital of Camp Perry.)

CAMP PERRY.*

Immediately following the outbreak of yellow fever in Jacksonville the Surgeon-General of the U. S. Marine-Hospital Service, in addition to establishing inspecting and fumigating stations at Waycross, Ga., Dupont, Ga., and River Junction, Fla., determined to establish a camp at which persons from Jacksonville or other infected places would be required to pass ten days' detention and observation before being allowed to pass the inspecting stations and proceed northward.

Practically, Camp Perry was an inland quarantine station, and, so far as known, is the first of this particular kind in the management of epidemic diseases. This was a "probation" camp. Refuge camps in the immediate neighborhood of cities affected with epidemic diseases are not a new thing, but the establishment of a camp to which persons from infected points could go, be kept under observation a sufficient length of time to demonstrate they were not infected, have their baggage disinfected, and be given "free pratique" is apparently a new departure in inland quarantine.

The establishment of Camp Perry was beset with difficulties such as the public can not be aware of.

* By W. H. H. Hutton, surgeon U. S. Marine-Hospital Service.

Passed Assistant Surgeon Guiteras was instructed to select a site for the camp at or near Boulogne, a small village near the St. Mary's River, midway between Waycross and Jacksonville. The panic following the announcement of the existence of yellow fever made it almost impossible for Dr. Guiteras to obtain a foot-hold in this region.

Wayscross turned him back, Boulogne and Folkstone warned him off with shot-guns, and for two days and nights he wandered up and down the railroad, sleeping one night in the woods and the next in a box-car on an isolated railroad side track subsisting in the mean time upon a can of beef extract he happened to carry with him.

He finally made himself known, and, gathering about him some citizens of Folkstone and Traders Hill, Ga., and Boulogne, Fla., located the site of Camp Perry. The site selected was on a bluff on the south side of St. Mary's River, the dividing line between Georgia and Florida, about 40 miles north of Jacksonville. This bluff extends along the river about 2 miles, and has an elevation of about 80 feet; the descent toward the river is very abrupt, and slopes gradually toward the rear. It is covered with the long-leaved pine, live and water oaks. At the foot of the bluff, directly in the rear of the point selected for the camp, a spring of pure, limpid water flows. A more admirable location for the camp does not exist in the State of Florida. The elevation was so great that the winds sweep freely through the camp, the drainage was perfect, and it was free from malaria and mosquitos.

Two hundred "A" tents had been ordered shipped from Port Tampa to Camp Perry; some lumber had been obtained, kitchen, dining-room, and store-house built, the tents set up, and about August 20 the camp, although incomplete, was opened for the reception of refugees. A special train was chartered to run daily between the camp and Jacksonville to enable people to reach it.

An additional camp was established about half a mile further down the bluff for the isolation of fever cases. This camp was at first put in charge of Dr. Julius Wise, of Memphis, and later Dr. Charles Fagét, of New Orleans. Cots and blankets were provided for refugees. This was the condition of the camp when opened. Soon complaints were made of the poor and inadequate accommodations, insufficient and ill-cooked food, the mixing of races, and other disagreeable features. It should be remembered, however, that the camp was established in a thinly-populated and panic-stricken region, and it was almost impossible to get laborers or materials; and, besides, while the object of the camp was to enable the people of Jacksonville to undergo the necessary quarantine to enable them to proceed northward, the authorities of that city sent out a large number of negroes and disreputable persons, which injured the *morale* of the camp and gave an additional cause of complaint. The Surgeon-General therefore ordered additional tents sent to the camp, the two races black and white separated, additional store-houses and dining-rooms built, and the erection of fifty small cottages. As it was impossible to obtain carpenters or material for these cottages at Camp Perry they had to be constructed at Waycross, shipped on flat-ears to camp, hauled up the hill with immense labor and placed in position. These cottages were constructed as fast as possible and began to reach camp early in September. Under the direction of the Surgeon-General the writer had supervised the construction of these houses at Waycross, but on the 8th of September was assigned to duty at Camp Perry.

On the 10th the Surgeon-General arrived at Camp Perry and assumed command. Military discipline and regulations were at once established, grounds cleared of stumps and grass, the cottages arranged in a quadrangle, tents rearranged in streets and alleys in rear of cottages, dining-rooms and cooking arrangements enlarged, so that in a few days the camp was in condition to provide comfortable accommodations for three hundred people, and later, over two hundred new tents purchased from the Army arrived, which increased the capacity of the camp, with the addition of Ducker portable barracks, to over six hundred, or three thousand a month.

The subsistence supplies were the best the market afforded, obtained from Savannah well prepared and served. Three substantial meals were provided daily at 6.30 and 7.30 a. m., 12 and 1 noon, and 5 and 6 p. m.

The Surgeon-General had a tall pine on the campus or square trimmed, and on this a top-mast rigged, upon which a national flag was run at sunrise and lowered at sunset. A bugler was employed, and daily the resonant notes of the bugle sounded "re-veille," meal calls, sick calls, 8 a. m. and 4 p. m., at which time all refugees were required to be at quarters for medical inspection; tattoo 9 p. m., when every one, except guards, retired to quarters, and "taps" at 9.15 p. m., when lights must be put out and conversation cease. This order and discipline appeared irksome to many people at first, but they soon fell into the routine, and later on appeared to enjoy it.

The established order and regularity was conducive to the health of the camp; indeed, it was remarkable to note the improved health and spirits of the refugees almost from the date of their arrival.

They would come from the death-beds of kindred and the gloom of a pestilence-stricken city, prostrated physically and mentally, scarcely able to get up the hill, yet under the orderly and systematic habits inculcated, they soon recovered their health and spirits.

Beyond the development of cases of yellow fever, not ten cases of sickness of any character occurred among the refugees, and those of little note. All cases of yellow fever received or developed among the refugees were transferred to the fever camp as soon as determined, where they remained until recovered, when they were sent back to the main camp for the usual quarantine before being discharged.

One thousand two hundred and eleven refugees were received into Camp Perry, nearly all from the infected city of Jacksonville. Many more would have come to Camp Perry from Fernandina, Macclenny, and Gainesville but for local quarantines which prevented them from reaching the camp.

Thirty-six cases of yellow fever were treated in the camp from first to last; of these six were brought from Callahan and two from Uptonville for treatment and to prevent the spread of the infection at those points.

Four cases came from Jacksonville, and twenty-four cases developed after arrival in camp. Three cases died, one of whom had black vomit two hours after arrival. Two were of drunken and dissolute habits.

Not a case of fever was contracted on the grounds. Of over eighty employés, none of whom, so far as known, ever had the fever, none contracted the disease or were sick at any time from any cause worth noting.

When the first cases of fever developed, the employés shunned them with fear and trembling; soon, however, they observed there was no apparent danger, and latterly they esteemed it a favor and a pleasure in attending to or removing them to the fever camp. Even unacclimated employés in the fever camp escaped infection.

The infection did not spread from the camp to the surrounding country. The citizens of Folkstone, Traders Hill, and Bonlogne never quarantined the camp, and after a time permitted constant intercourse between their villages and the employés of the camp.

One thousand two hundred and eight refugees passed the required detention, were given "free pratique," and proceeded on their way to all parts of the country, and, so far as known, not one of them carried or developed the fever at any time or anywhere after discharge.

The discipline and *morale* of Camp Perry was excellent; not 1 per cent. were disciplined for any or all causes.

They were allowed all possible liberty in enjoying themselves, except leaving camp. Divine services were frequently held by white and colored. Minstrel shows and picnics were permitted, and altogether the physical and mental condition of the people of the camp and neighborhood was in striking contrast with the panic and demoralization manifested in other parts of the country.

Such was Camp Perry. With the experience gained there, in the future, if necessary, such camps can be established more speedily and greatly improved. First-class wall tents, such as the army hospital tent, are better adapted for camps, and will accommodate from four to six more people than the small cottages, and cost but little more. Two hundred hospital tents will accommodate one thousand two hundred people comfortably, and should be provided and made available for immediate use. The small "A" tents are unsuited for women and children, but will answer for men or boys.

Instead of cots with canvas bottoms, with their continual breaking down and their liability to infection, wire-mattress cots should be provided. The wire-mattress cots cost no more than double the cost of the unreliable canvas cots; will not break down or become infected, and can be used year after year. Pillows and sheets should be furnished for ladies and children. With these addenda to those utilized at Camp Perry such camps will become as nearly perfect as it is possible to make them, and they can be put in operation at short notice.

The deductions to be drawn from the results attained at Camp Perry are, first, that yellow fever is infectious but not strongly contagious; second, that the disease is peculiar to, and becomes epidemic only in, crowded communities. The "favorable conditions" of which we hear so much for the propagation of the yellow-fever poison, whatever that may be, are continued high temperature, moisture, and last, but not the least, accumulations of filth, especially animal matter and human excreta. Take away the last and the "conditions" fail.

So I say to our Southern people, remove absolutely and at once all human and animal excreta, and yellow fever will not propagate itself in your midst, and panics, demoralizations, and shot-gun quarantines will no longer paralyze whole States and sections of our country.

I can not close this account of the operations of the Marine-Hospital Service without expressing my thanks to the Supervising Surgeon-General for the manner in which he devised and carried out the rules and regulations deemed necessary to prevent the spread of yellow fever in 1883, and also my sincere appreciation of the services of all other officers engaged in the arduous and trying duties assigned to them with whom I came in contact. Thanks are also due the general manager and officers of the Savannah, Florida and Western Railroad, for their active coöperation in forwarding supplies.

That the disease reached Jacksonville, and from there spread to other points in Florida, was no fault of the Surgeon-General or the Marine-Hospital Service.

The State of Florida had repeatedly been warned of the impending calamity, and the spread of the fever therein is to be attributed only to the apathy and indifference of its government.

That it did not spread to other States I feel confident was due to the measures instituted and carried out by the Marine-Hospital Service.

UNITED STATES INSPECTION SERVICE IN THE EPIDEMIC OF YELLOW FEVER, 1888.*

In obedience to telegraphic instructions from the Supervising Surgeon-General, U. S. Marine-Hospital Service, dated August 18, 1888, to proceed to Waycross, Ga., and assume charge of fumigating stations, I proceeded to that point at once, arriving there on the evening of the 19th.

Prior to my assignment to this duty, inspection and fumigating stations had been established at River Junction, Fla., Dupont, and Waycross, Ga., these points guarding all outlets by railroad from Florida into other States.

* By W. H. H. Hutton, Surgeon Marine-Hospital Service.

Instructions had already been issued by the Supervising Surgeon-General to fumigate all baggage arriving from any point in the State of Florida, a wise precaution, for the reason that in the panic and stampede following the announcement of the existence of yellow fever in Jacksonville, August 9, many people had fled therefrom and had sought refuge and safety from the impending epidemic in many of the interior towns of Florida, and it was impossible to know, for a time, but that some might have carried the infection with them. On my way to Waycross I saw the fumigating station at River Junction, Fla., in full operation under the supervision of Assistant Surgeon H. D. Geddings, Marine-Hospital Service. Here, however, but little was to be done, as but few people were traveling in that direction from Florida.

At Dupont, Ga., Dr. W. M. Williamson, a local physician, had been appointed inspector, and was inspecting trains and passengers, but was not quite prepared for fumigating baggage.

Arriving at Waycross I found Passed Assistant Surgeon Urquhart on duty, with Dr. Folks, the mayor of Waycross, as assistant. Passed Assistant Surgeon Urquhart had been on duty eight days prior to my arrival. The stampede from Jacksonville through Waycross from August 10 to August 17 had been overwhelming. Trains of ten, twelve, and sometimes fourteen coaches packed with panic-stricken fugitives passed through Waycross twice daily, bound northward. These trains carried two cars, and frequently three cars, filled with baggage. It was not deemed necessary at that time to stop these crowded trains, for it was understood that so long as the authorities of Jacksonville kept the then relatively small number of cases of fever isolated and under guard, those not directly exposed could leave the city for northern points, the prime object being, as far as practicable, to depopulate the city.

For the speedy fumigation of baggage and mails the Supervising Surgeon-General, on August 12, ordered from Savannah, Ga., six tight box-cars, which arrived at Waycross August 16. These cars were divided into two compartments, in which were arranged frames and wire-netting shelves, on which baggage, mails, or any article, could be completely fumigated.

Two of these fumigating cars had been sent to River Junction, Fla., two of them to Du Pont, Ga., and the remaining two cars to "A, 99," a switch on the Jacksonville branch of the Savannah, Florida and Western Railroad, 3 miles south of Waycross. Trains from Jacksonville and points south were stopped at "99" for inspection. Trains from the west and southwest were turned off the main line west of Waycross by means of a Y, and sent to "99" for inspection. All passengers, by both routes, were transferred to other cars at "99" and sent on to Waycross and northward. No passenger coaches from any part of Florida were allowed to proceed beyond Waycross. The two fumigating cars assigned to "99" were at once utilized for fumigating the mail matter, two car-loads of which had accumulated at this point awaiting the arrival of the fumigating cars and apparatus, and they were taxed to their fullest capacity with a force of eight or ten postal employes, working day and night for several days, before the mail matter could be worked off.

Passed Assistant Surgeon Urquhart had not yet begun the fumigation of baggage for the want of the necessary apparatus, but he had, by order from the Surgeon-General, taken off the trains all the baggage received on the 18th and 19th of August.

The construction of a building 120 feet long by 20 feet wide, divided into four compartments for fumigating purposes, had been contracted for at "99," but with all the obtainable assistance this building could not be completed for three or four days after my arrival. Therefore I immediately procured two more tight box-cars, seized 45 pounds of telephone wire, got nails, staples, and hammers; took them to "99," and, aided by assistant superintendant Avielhe and yard-master Morris, both of the Savannah, Florida and Western Railroad, soon had the box-cars strung overhead with wire lines in every direction, and at once set about fumigating the accumulated baggage. Trunks, boxes, valises, etc., were unpacked in the fumigating cars, contents hung on the wires, and two pots, filled with burning sulphur, placed in each

car, and the doors closed. At the end of six hours the doors were opened, trunks, etc., re-packed and shipped to the owners address, and a fresh lot placed on the wires and fumigated.

Ordinarily about eight trunks and contents could be fumigated at one time in each car.

On the 21st I proceeded to Du Pont, Ga., and set the fumigation station there in active operation.

On the 25th the fumigating building at Waycross was completed, and from that date the fumigation of baggage, mails, and all articles likely to carry infection, was carried on smoothly, and with but slight detention.

All passengers from Jacksonville, then the only known point of infection, were warned, in accordance with instructions from the Supervising Surgeon-General, not to stop at any point south of an imaginary line drawn from Wilmington, N. C., to Memphis, Tenn; otherwise they would be returned to Camp Perry for ten days' detention. Passengers from other points in Florida were closely scrutinized, and unless possessed of undoubted evidence of not having been exposed to the infection, were not allowed to proceed, and baggage of any and every description detained, fumigated and forwarded.

Attempts were made to avoid detention and fumigation of baggage by shipping it by express. This, however, was frustrated by the seizure of all such packages and ordering the express companies not to receive or transport any article from Florida liable to carry infection.

By the 24th of August, it having become apparent that the fever had gotten beyond the control of the authorities of Jacksonville, the Supervising Surgeon-General instructed me, by telegraph, to stop all passengers from Jacksonville by either route and return them to Camp Perry. Accordingly, on the morning of the 25th I turned back from "99" all Jacksonville passengers, part of whom got off at Camp Perry and the balance returned to Jacksonville.

On the 28th of August Department circular No. 96 was issued, prohibiting all railroads in Florida south of and including the Savannah, Florida and Western Railroad from receiving passengers on board trains from infected points except those destined to Camp Perry. This circular order was received at Waycross August 29, and from that time until the close of the epidemic, with the exception of the special trains of September 2 and September 10 to Atlanta and Hendersonville, respectively, and two or three isolated instances, it is not known that any persons from infected points passed out of the State of Florida except after ten days' detention at Camp Perry.

An attempt was made by the Florida Railway and Navigation Company on September 1 and 2 to transport passengers from Jacksonville to Nashville, Tenn., but they were turned back at Live Oak by Passed Assistant Surgeon Urquhart, which officer had been transferred from Du Pont to Live Oak August 31. The Florida Railway and Navigation Company, in apparent retaliation for this act, instructed their agent at Live Oak that they had no knowledge of or recognized any quarantine regulations except those issued by local authorities, and would give Dr. Urquhart only ten minutes to inspect, say, 20 passengers; if not through by that time the train would proceed. This being reported to the Supervising Surgeon-General, brought instructions to the effect that "no railroad or other official would be allowed to interfere with an officer of the United States in the discharge of his duty," and that his authority to employ sufficient force to carry on the inspection was unlimited. The Florida Railway and Navigation Company's officials in the early months of the epidemic acted as obstructionists to rules and regulations adopted by the Marine-Hospital Service in endeavoring to prevent the spread of yellow fever. They would not afford any facilities to marine-hospital officers for inspecting or guarding their road. They attempted to ignore or override officers in the discharge of their duties, with the result that the yellow fever spread to Fernandina, Callahan, Macclenny, Sanderson, Live Oak, Gainesville, and Ellaville, towns all on their road. However, I give the offi-

cials of that road credit for asking advice and instructions and aiding us in the discharge of our duties later in the season, when the mischief was done and the infection came home to themselves.

On the other hand, the officials of the Savannah, Florida and Western Railroad, from superintendent to conductor, complied cheerfully and strictly with every rule and regulation, and gave us every facility in their power to aid in the prevention of the spread of the disease, with the result that the fever never obtained a foot-hold at any points on their road except at Callahan, Live Oak, and Gainesville, where it was carried by the Florida Railway and Navigation Company. The entire State of Florida having been placed under quarantine restrictions immediately after the fever had been declared epidemic in Jacksonville, the Surgeon-General deemed it advisable that the restrictions be removed from non-infected places as soon as safety permitted. Accordingly, Dr. J. L. Posey, of New Orleans, La., was engaged as sanitary inspector, and as rapidly as possible visited and inspected all the principal points in Florida east of the Chattahoochee River and west of and including Lake City. All this portion of the State being found free from the fever, the inspection and fumigating stations at River Junction and Du Pont were abandoned August 31, and the apparatus removed to Live Oak, which point controlled all travel from the South, and released the western part of the State from quarantine restrictions, and, except at Ellenville, twelve miles west of Live Oak, the fever did not subsequently appear at any point in the State west or north of our inspecting stations. Dr. Posey then, September 3, inspected Gainesville and reported the town healthy. At that date a labor riot was in progress in Fernandina, where a company of State militia had been sent from Gainesville to aid in maintaining order. On account of the disquieting rumors concerning fever in Fernandina, Dr. Posey advised the health authorities of Gainesville not to permit the return of her citizen soldiery without undergoing quarantine. To their disregard of his advice is to be attributed the introduction of the fever into Gainesville.

From Gainesville I ordered Dr. Posey to Palatka, which place he found healthy. From thence to Orlando, also found healthy. Unauthenticated rumors of the prevalence of yellow fever at Macclenny had been floating about for several days, and while the intention had been to have all the principal places to the southward of Jacksonville inspected and freed from the bane of suspicion, and gradually close our lines upon Jacksonville, yet I deemed it best to investigate the rumors concerning Macclenny. Therefore I ordered Dr. Posey, September 8, to Macclenny to investigate the reports of yellow fever existing there, and if true to come to Camp Perry.

The condition in which Dr. Posey found Macclenny was simply horrible. The place was a charnel-house. With sixty cases and five deaths, the local physician persisted in calling the disease "a grave form of bilious fever." It is almost incredible that any member of the medical profession should be so blinded as to the true nature of the disease. It can be attributed only to ignorance or moral cowardice on the part of local physicians.

It is creditable to the intelligence of Dr. Posey to note that of all the points visited and inspected by him and pronounced free from yellow fever, subsequent events have demonstrated the correctness of his opinions. Gainesville and Live Oak became infected after his inspections.

While on duty at Waycross, in addition to my duties as general supervisor over the several inspectors and fumigating stations, I visited Blackshear, Ga., several times for the purpose of isolating a suspicious case there, and subsequently in fumigating and disinfecting the premises in which the case was isolated. I also visited Valdosta, Ga., to investigate the reports of a suspicious case; also Du Pont and Live Oak several times to personally see that the inspectors at those points were attending to their duties; also I went to Atlanta with the first special train of Jacksonville refugees.

At this date, September 8, I was directed to take charge of Camp Perry, and the inspection and fumigation stations at Live Oak and Waycross were placed under direct charge of Passed Assistant Surgeon Urquhart and Assistant Surgeons Magruder

and Geddings. Notwithstanding my assignment in charge of Camp Perry, under instructions from the Supervising Surgeon-General, I still exercised supervision over the officers of the Marine-Hospital Service on duty in Florida, and accordingly from Camp Perry, with its multifarious duties, with my limited force of officers, we handled the fever at Callaban so effectively as to stamp it out within three weeks, and at Uptonville within a week. The latter place was in our rear; we cared very little for the enemy in our front. It is the maxim in war to keep your lines of communication open, and nothing so demoralizes a soldier as to find the enemy in his rear. In the case of Uptonville, I discovered the disease there within forty-eight hours after its arrival; so we began active disinfection with sulphur, corrosive sublimate, and fire, brought the sick and the exposed into camp, and prohibited trains from stopping at that point, with the result that between Monday evening and Saturday the disease was imported, developed, and stamped out. This little epidemic resulted in three cases and one death.

Live Oak was inspected, promptly depopulated, and disinfected by officers of the Marine-Hospital Service, the disease being short-lived at that point.

Green Cove Springs and Enterprise were also inspected by officers from Camp Perry, and fever found to exist in both places, in the latter in a severe form. To the skill and energy of Drs. Posey and Caldwell in cleaning Enterprise of its foul and filthy condition, and thorough disinfection, is to be noted the gradual diminution of the virulence of the disease almost from the day of their arrival and its final extirpation.

As before stated, at Camp Perry we feared little for the enemy in our front. Florida was in a state of chaos, all counties and towns were arrayed against one another, no two communities had the same health or quarantine regulations, and such as they had were frequently as unstable and unreliable as the vagaries and fears of the human mind could make. Self-preservation was probably the main motive, but greed and avarice were the controlling motives in many instances. With this chaotic condition of affairs in Florida, it was impossible for officers of the Marine-Hospital Service to do justice to themselves or communities in that State. If an inspector pronounced a town or city free from infection, he was feted and praised as a "scientific expert," but if he should declare the fever to exist in any locality he instantly became an outcast, and was forced to endure privations and hardships in order to get away from that locality, or declared a "real-estate speculator from California."

It followed, therefore, that so far as the State of Florida was concerned we could do but little, in fact we were nothing more or less than agents dispensing the charity of the General Government, and under the State law the county boards of health had supreme authority; on the other hand, the governor of Georgia gave the Marine-Hospital officers the authority of State quarantine officials, and in this State we could enforce all means, rules, and regulations, for the prevention of the spread of the disease. Therefore, when the suspected case developed at Blackshear, in Georgia, without question, the case was placed under guard, and isolated absolutely, infected bedding destroyed, clothing and other articles thoroughly disinfected, premises fumigated and disinfected, and I even arrested and confined to the premises for fifteen days an inspector sent out from Savannah by the authorities to investigate the matter. So, when Ben. Upton, who had been visiting infected cities, and whom I had threatened with arrest on the 5th of September if I ever caught him in the State of Georgia during the epidemic, returned to Uptonville (overland), just recovering from the fever, on the 22nd October, I had no hesitation in acting promptly, bringing Upton and all exposed persons into Camp Perry.

The net result was that Georgia, immediately exposed more than any other State, escaped the fever. Georgia, like Florida, had no State board of health, and several localities stationed inspectors at Waycross. These inspectors were placed under my control, and their duties were perfunctory, so that whatever they did, or thought they did, after the Government inspectors had acted, did not aid a particle in protecting their respective localities from infection, for the simple reason that, so far as now known, no cases of fever developed in other States beyond our lines, except at

Decatur, Ala., and of this case I am informed that the person arrived in Decatur on the 21st of August, before the establishment of quarantine by the Government.

I may contrast here the actions of the Government inspectors and of many of the so-called local inspectors. The Government inspectors, used to discipline, rigidly enforced all quarantine rules and regulations without regard to localities, prejudice, or favoritism, but with politeness. No exceptions were made and no discretion was used or allowed. It was their business, not a temporary brief authority. People and communities with whom they came in contact exhibited the greatest confidence and reliance upon the actions and efforts of the Government inspectors in preventing the spread of the infection. Waycross was peculiarly exposed, inasmuch as nine-tenths of the passenger and freight traffic from Florida passed through or was transferred at that point; yet, from the day the Government took charge of the quarantine at that point, and the citizens noted the actions of the Government officers in enforcing the rules and regulations issued by the Supervising Surgeon-General, they felt secure. No panic or feeling of insecurity was ever shown in that city at any time.

On the other hand, some of the local inspectors acted as though the safety of the nation depended upon them and with blustering, bull dozing actions would terrorize passengers of the common class, but if of known and influential classes exceptions were made. Therefore, in the estimation of this class of inspectors, the poor and lonely were peculiarly liable to carry the infection, and were threatened, hounded, and driven hither and thither, while the rich and influential were exempt, and could go where they pleased.

In addition to inspections necessary to aid in preventing the spread of yellow fever to other States later in the season, it became necessary to aid people to return to their homes in central and south Florida without danger of taking the infection with them. To avoid the danger at Jacksonville a "Y" was constructed by the railway authorities outside the limits of that city, connecting the Savannah, Florida and Western Railroad, and the Jacksonville, Tampa and Key West Railroad. Callahan had been depopulated, and all cases of fever there had been taken to Camp Perry, and the place thoroughly and repeatedly inspected and disinfected.

About October 10 through trains were run from Waycross to Sanford and other points in southern Florida. By order of the Supervising Surgeon-General, Inspector Williamson was placed on the trains. His instructions were to allow no passengers to board the trains south of Falkstone, Ga., and north of Orange Park, Fla., and to close and lock the doors, and close the windows and transoms of the coaches for 2 miles on either side of and through Callahan, and 5 miles on either side of and through La Villa, near Jacksonville, and to run through at a speed of not less than 10 miles an hour, and also to see that each returning passenger was provided with proper health certificates to show they had not been exposed to infection within thirty days past.

Putnam County board of health also placed an inspector on this train with almost similar instructions. Soon, however, this board changed their regulations to such an extent as to create confusion, and threatened to stop all travel; so much so that the railroads appealed to me to have the Government take charge of the matter. As the Government had no law under which its officers could act, I had no alternative but to go to Palatka and confer with the Putnam County board of health, which I did October 23. Satisfactory arrangements were made by which this travel would not be interrupted, and the original regulations complied with.

Assistant Surgeon Geddings was assigned to duty as inspector, and later Assistant Surgeon Magruder. This duty was laborious, requiring a run of 280 miles daily, beginning at 4 a. m. and generally ending at 5 or 6 p. m. It is safe to say that over five thousand people returned to their homes under this arrangement without danger to themselves or their localities before the quarantine was raised. Besides these duties those officers, as well as the officers at Waycross and Live Oak, were instructed to prevent the return of refugees to Jacksonville, and in the discharge of this disagree-

able duty a number of returning refugees, bound for Jacksonville, were stopped at Waycross and Live Oak and put off the trains.

This, briefly, is the history of the inspection service of the officers of the Marine-Hospital Service under my charge in the epidemic in Florida, and I can safely say that, to all calm and thoughtful people with whom they came in contact, their services were entirely satisfactory. They avoided no danger, endured hardships and privations without complaint, and were ready at a moment's notice to proceed wherever needed, and performed their often heartless and disagreeable duties without forgetting they were gentlemen. It is also satisfactory to know that all parts of the country outside of our line of inspection and liable to the infection escaped the disease, except Decatur, Ala., and, as stated above, this point became infected before the establishment of quarantine by the Government. If any infection was carried beyond our lines it would have developed somewhere, and it follows, therefore, that the panic and the inhuman shotgun quarantines throughout other States were unnecessary and uncalled for.

The experience gained in the epidemic in Florida by the officers of the Government, if properly utilized, would be of incalculable value in dealing with epidemics in the future.

In the first place, the national Government should place upon its statute-books some law which would dignify and give authority to the acts of its officers. This need not conflict with the autonomy of the States.

States should be compelled to establish boards of health, and they should have the power to compel local boards to observe reasonable rules and regulations for the management of epidemics. When States conflict in their health regulations, or local boards conflict with one another, the national authority should be supreme.

When once the people understand that every precaution known to science, or developed by experience, with power to enforce the same, is being taken, panics and demoralization will be things of the past. It is the unknown that creates disquiet and unrest in the public mind, and when the truth is made known the worst is known and there is no more panic.

The people of Florida showed no faith in their local boards of health. Moral cowardice, ignorance, or, in the absence of the latter, the policy of concealment and denial prevailed to a large extent amongst the profession. Hence, the yellow fever prevailed in Jacksonville, Macclenny, Fernandina, and Enterprise for weeks, if not months, before it was acknowledged, thus endangering the whole country.

Eminent physicians in Florida have informed me that it was as much as their reputation or physical or financial welfare was worth to announce a case of yellow fever in their midst; hence the policy of denial and concealment, to the detriment of other communities, until patent to the general public.

Therefore, if the General Government is expected to aid States in preventing the spread of epidemic diseases, especially yellow fever, it should keep in the field discreet and expert inspectors; these should be well qualified physicians, having experience with the disease and acclimated. They should be empowered to inspect any locality, to place local physicians under oath as to the nature of prevailing diseases, and to visit any patients with their attending physicians.

I am sure from my intercourse with a large number of the physicians in various parts of Florida that they would gladly welcome and aid such inspectors.

To avoid detention or demoralization of travel and traffic, Government inspectors should be placed on all trains; these inspectors should conduct the trains for at least 100 miles in all directions from any infected area. By keeping himself informed of the sanitary condition of all places likely to be infected or suspected, all "suspects" could be kept in separate coaches from those bound for healthy points, and no person from an infected or suspected point should be permitted on the train unless bound to a point not liable to the infection.

When the infection becomes epidemic in any locality no passengers therefrom should

be permitted to board any train for any reason whatsoever until they shall have been quarantined.

This would obviate the boarding and detention of trains by local inspectors, the harassing of passengers, demoralization of business, and quiet the public mind.

While I do not share in it, the public mind has been educated to the belief that baggage and many other articles are more likely to carry infection of yellow fever than the person. The extent to which this idea has been carried is incredible, if not ridiculous. Think of a community requiring a locomotive to be disinfected, or another prohibiting the entry of creosoted timber from a non-infected district, or fish packed in ice, etc.

It is possible that all textile or porous articles closely packed in trunks or boxes in an infected atmosphere, may contain fomites, which, being released in another locality, where the conditions are favorable, may spread the disease, but that cast-steel, ice, or some kinds of mail matter can carry infection of yellow fever is monstrous.

It would be well, therefore, for sanitarians to educate the public mind as to what are and what are not dangerous articles to carry from infected places, and to such articles the best known methods of disinfection or fumigation should be applied before they are allowed to be taken from an infected to a non-infected district.

SOME PRACTICAL POINTS ON DISINFECTION.

The methods of disinfection employed by the Marine Hospital Service was principally fumigation with sulphurous-acid gas in close cars or chambers. To many articles this method is ruinous; many a fair lady's silks and velvets were spoiled beyond redemption at Weyeross and other fumigating stations. I am convinced that the mercuric chloride is a better disinfectant or germicide than sulphurous-acid gas, however strongly applied. I was especially struck with this in the disease at Callahan. Immediately after Dr. Posey had depopulated the place and brought the sick to Camp Perry, he spent two days fumigating all infected places there. Ten days after young Matthews returned to Callahan and slept in the hotel where the disease prevailed, and within forty-eight hours he was attacked with the fever; he was brought into camp, and then Dr. Guit  ras disinfected the town with the bi-chloride, 1-500, and no other cases occurred. Dr. Guit  ras used the bi-chloride at Uptonville, 1-250, and Dr. Geddings the same at Live Oak, in neither of which places did the fever reappear.

Heat is also as good, if not a better, germicide than sulphurous-acid gas.

It is perfectly feasible to construct hot-air chambers and disinfecting apparatus upon wheels. Construct a car, 12 feet wide, 8 feet high, and 60 feet long, of light boiler iron covered on the outside with fire-proof felting or asbestos and all covered with seven-eighth inch sheathing. Divide each car into 20-foot compartments, leaving the central one open. Arrange sliding racks in the two end ones in such a manner that they can be drawn out into the open center, hung with articles and pushed back to place. Six or eight racks could be fitted to each compartment, coils of steam-pipe could be placed between racks, and connections made with the steam-pipes of a locomotive, and heat introduced to such a degree as 120 or 130 pounds of pressure would generate.

Small pipes with fine holes could be placed throughout these chambers in such a manner that solution of the bi-chloride could be sprayed upon the articles; then by the application of heat, the disinfection is still further intensified by the generation of a mercuric vapor, which disappears as the heat continues.

Thus we have both methods applied at once without injury to the articles, and as complete as the most critical sanitarian can desire.

Where sulphurous-acid gas is deemed best for any class of articles, a small furnace for the burning of the sulphur could be placed below each chamber, and one or all the methods applied.

Several such cars should be constructed, stocked with first-class tanks, cooking

apparatus, disinfectants, and all non-perishable articles necessary for the immediate establishment of inspection and disinfection stations and quarantine camps, and stationed at strategic points.

Wayercross, for instance, is the key to Florida and the south Atlantic region. Within forty-eight hours after being summoned, with the means and apparatus at hand, the quarantine and inspection station could be in full operation.

THE YELLOW FEVER IN TAMPA, PLANT CITY, MANATEE, AND PALMETTO.*

On the 21st day of May, 1887, the Board of Health of Key West officially announced to the country the presence of a suspected case of yellow fever in that city. Considerable excitement on the island and at various points in south and east Florida was the immediate result. A few other cases rapidly following the first, by the 4th of June a wild panic was developed in Jacksonville which came down the line of railway from that city to Tampa with telegraphic rapidity. County and municipal quarantines were established with from fifteen to twenty days' detention against Key West and all other points not quarantining against Key West. To Jacksonville belongs the doubtful honor of taking the lead in this quarantining business, which constrained all the other county and municipal authorities south of her to take similar action. As a result Tampa put on a prohibitory quarantine against persons, baggage, and freight, except tobacco and the United States mails from Key West and Havana. A senseless panic prevailed throughout south and east Florida, causing many people to leave their homes and seek safety in other States. Travel and transportation were seriously impeded and business interests greatly suffered on account of these local quarantines. It soon became obvious that the evils resulting from these local quarantines, incited by terror rather than the immediate presence of any real danger, were too great to be endured if it were possible to find a remedy. To this end a number of boards of health of some of the counties of south and east Florida held a convention of their representatives in Jacksonville in the latter part of June and organized the "Florida Health Protective Association," which was to take charge of the coast quarantine and let the interior counties do away with their local quarantines. Hillsborough County did not become a member of this county confederacy, and therefore had nothing to do with the Florida Health Protective Association. The organization of this association, although it had no legal status, had the happy effect, however, of allaying to a very considerable extent public apprehension and relieving inter-county travel and business, of restrictions. It also permitted Tampa to take off her prohibitory quarantine against Key West and Havana, and resume the restricted intercourse with those places which her quarantine regulations already provided for as to infected ports. In the mean time the yellow fever had become epidemic among the unacclimated of Key West, whither a considerable number had been attracted in recent years; and especially a considerable number of mechanics and laborers to obtain work after the disastrous fire of the preceding year, which left bare a large area in the most densely populated portion of the city. In consequence of the stringent quarantine measures adopted the 4th of June, these unacclimated people were cut off from escape from the island by the steamers of the Plant Line, plying between Tampa and Havana, via Key West, twice a week. The most of them got away from Key West by New York or New Orleans steamers, while others escaped to the main land in small boats; but so far as known these refugees neither sickened after leaving the island nor carried the disease into any other community.

*By John P. Wall, M. D., president of Hillsborough County Board of Health.

In July a refugee station was established by the Marine Hospital Bureau on Egmont Key at the mouth of Tampa Bay, about 35 miles from Tampa and 7 miles from Manatee River, on which river near its mouth, are a number of small towns and villages. About thirty unacclimated persons from Key West were received at this station during July and August, among whom were a few cases of the fever and one death. One of the attendants of the station, a negro man hired in Tampa to cook, had the fever. After a ten days' detention these refugees were sent up to Tampa; though after it was known that there had been cases of yellow fever at the station, the refugees sent up from there were detained at the port quarantine station, 5 miles from Tampa, five days more. The physician in charge of this refugee station on Egmont Key, Dr. E. Hebersmith, visited Tampa and villages on the Manatee River occasionally while at the station.

Public expectation having been disappointed in the fever not having made its appearance at any point on the main land in June, July, and August, and its perceptible decline in Key West during the latter month, tended materially to dissipate popular apprehension and lead to more or less clandestine communication between Key West and Tampa and other points on the Gulf coast. During the whole season the custom-house officers at Tampa were making efforts to catch smugglers who, they believed, were carrying on a contraband traffic with fishing smacks from Havana, if some of them did not even venture to go to Havana themselves. That fruit-boats, claiming to have only been to points and islands on the extreme point of the peninsula after fruit, did go to Key West and return to Tampa, evading the quarantine, is a fact fully established by subsequent investigation; and that such fruit-boats communicated with Havana fishing smacks and carried on a contraband traffic with them is more than probable, as it is well known that such traffic is quite common along the Gulf coast of the Florida peninsula. The quarantine authorities of Tampa having prohibited the bringing of fruit or any other freight from Havana, except tobacco for the cigar factories at Tampa, to supply the Cuban population with tropical fruits and other articles, which to them were necessities, was, very naturally, a great incentive to unscrupulous men to take all risks in supplying the demand for these articles.

At any rate, the fact is established beyond question or doubt that the first cases of the fever appeared in Tampa among fruit dealers and their intimates; and that after the 4th of June the Plant Line of steamers did not bring any fruit from Havana or Key West the remainder of the season, nor had any of those first attacked by the fever been to or returned from either Key West or Havana on the Plant steamers during the season. Nor did a case of the fever appear in any one who had come from either Key West or Havana during the season, nor in any one with whom such passengers came in contact in private dwellings or boarding houses. The American passengers by the Plant Line steamers from both Havana and Key West during the summer were mostly on their way to New York and other Northern cities. Those who stopped in Tampa from both Havana and Key West were, as a rule, Cubans originally from Havana, who are, as is well known, already thoroughly acclimated to yellow fever. Moreover, the Cuban population of Tampa live almost exclusively in a quarter of the city to themselves over a quarter of a mile from the thickly populated limits of what is known as Tampa proper. Between this Cuban quarter, called Ybor, and the old town there are a few scattering houses and several orange groves of from 2 to 6 acres in extent; communication between the two places is by a steam street railway.

Now, it seems that cases of the fever occurred almost simultaneously about the middle of September in fruit dealers in both Ybor and the old town of Tampa. The first victim was an American named Turk, who died on the 22d of September. He was a fruit dealer at Ybor, but resided about 100 yards out of Ybor. This man's relations claimed that there was an Italian fruit dealer sick shortly before Turk was taken ill; and that Turk got the disease by using this Italian's blankets. It is furthermore acknowledged by them that this use of the Italian's blankets occurred

when absent from Ybor and on a camp hunt. The name of this Italian was Pepe, who soon after disappeared. The first case of the fever in the old town, that my investigations have enabled me to identify, was an Italian fruit dealer named Louis Moses. He was sick on the 16th of September and had probably been ill a day or two then. The character of his disease was not recognized at the time, but the fact that he remained in Tampa throughout the epidemic and was not sick with the fever again, is, in my mind, convincing evidence that his illness in September was an attack of yellow fever. An Italian youth, nearly grown, staying with Moses was also sick about the same time, probably a few days later, and escaped a subsequent attack during the epidemic. An Italian tailor named Benito, sickened on the 26th of September, although the nature of his illness was not recognized until the 5th of October, when I was asked to see him and found him suffering with yellow fever, the icteric color of skin resembling that of an orange or pumpkin. On the 12th of October I saw two other Italian fruit peddlers who had been ill eight or ten days. Both of these died on the 14th of October. There were, however, a few cases of the fever in the latter part of September among Americans in the old town, but in every instance, almost, I have been able to trace these people to the places of these fruit dealers. Some of these cases were among children who went to Louis Moses almost daily to buy fruit. No physician attended them, but their mother died of the fever on the 13th, having sickened on the 5th of October.

These facts show pretty conclusively that the fever began in Tampa among fruit dealers who obtained their fruit from small boats plying down the coast after fruit, all of which I have since learned visited Key West, and then on returning evaded the quarantine on the bay, which was easily accomplished in a bay 6 miles wide. I have since learned also from a prominent citizen, as well as numerous others, that smuggling was carried on during the whole season, the boats finding safe retreats at many different points along the extensive bay shore.

It is deemed worth while to mention these facts to correct the erroneous conclusion jumped at by the public as to the responsibility of the Plant Line of steamers for the introduction of yellow fever into Tampa in 1887. These steamers began to ply twice a week between here and Havana, via Key West, in February, 1886, and during the summer of 1886 brought at least two thousand Cubans from Havana to become residents of Tampa. Last year no cases of fever or any infected goods could be traced to these steamers, and this year they have not introduced any fever nor infected goods into Key West from either Havana or Tampa, although touching at Key West four times a week from infected places, and taking passengers from those infected places to Key West every trip. Nor do I believe that the fever would have gotten into Tampa last year but for the stringent prohibitory quarantine restrictions against freights and fruits being brought from Havana by these steamers, which incited to smuggling and clandestine communication with Key West.

During the quarantine season, from the 1st of May to the 1st of November, these steamers are not permitted to remain in Havana at night, in fact do not remain there over seven hours in the day, entering at 6 a. m. and leaving at 1 p. m.; do not go to the wharves, and all suspected persons and goods are excluded from taking passage or being put aboard; no soiled baggage and no bedding is allowed to be brought; and, finally, what baggage or freight is taken aboard is fumigated with sulphur in the hold of the ship en route. All this is done under the supervision of Dr. D. M. Burgess, United States sanitary inspector, Marine-Hospital Service, for the port of Havana. The bilges are treated twice a week with disinfectants, alternately with mercuric chloride and chloride of lime, and the ships subjected to thorough medical inspection at Havana and Tampa every trip to see that they are kept in first-class sanitary condition. They are, moreover, new iron steamers, which kind of vessels, all admit, is not to be classed with wooden vessels in a sanitary point of view. In view of all these facts, those relating to the appearance of the fever in Tampa in 1887, the non-appearance of the fever in 1886, when there was a large immigration from Havana to Tampa, with no restrictions on fruit and other freight, and conse-

quently little if any incentive to smuggling; no fever being introduced into Key West this year by these steamers from either Tampa or Havana, and last, but not least, the extraordinary care exercised by the company to not only avoid being the means of introducing yellow fever into the United States, but to prevent their ships from becoming infected, I feel fully justified in making the declaration that the yellow fever was not introduced into Tampa in 1887, or at any time prior or subsequent, by the Plant Line of steamers.

The company's code of sanitary regulations to be observed by her officers, and the quarantine regulations of the ports of Key West and Tampa embody the principles, so far as applicable, of the Technical Commission of the International Sanitary Conference of Rome, 1885. These quarantine regulations exclude suspected persons as passengers—those not acclimated to yellow fever by a previous attack or nativity in a place where it is endemic—soiled baggage, all bedding, and all freight which the United States sanitary inspector can not certify to as being uninfected. A single passenger aboard without the certificate of acclimatization from Dr. Burgess, the inspector in Havana, subjects the ship to ten days' quarantine. The true principle to be observed in all quarantine regulations is that of exclusion at the infected port of persons liable to bring the disease to the home port in the incubative stage, and all infected goods or baggage. This is by all odds much safer than to depend on providing for the sick—for detention is for the purpose of seeing if they will become sick—and disinfecting baggage and freight at our own doors, as it were. This principle is recognized by the sanitarians of Europe and acted on by England, and applies with special force to first-class iron steamers intended for travel and rapid transit. Of course, for sailing vessels and an inferior class of steamers, and especially for those remaining at night in the infected port, it would probably not hold good.

With this digression we will return to the account of the fever in Tampa the last of September, 1887. I was absent from the State from the 2d to the 25th of September, and it was during my absence that the first victim of the fever, Mr. Turk, died, on the 22d of September. On reaching home I found considerable excitement had been occasioned by Turk's death, some saying it was yellow fever, others that it was not. The city authorities had, however, put Turk's family and relatives in quarantine by placing a guard around the house. A Cuban physician attended Turk, and on the day of his death said it was yellow fever. That it was yellow fever he soon denied, and with another physician concurred in calling it hemorrhagic-malarial fever. On the 26th of September I saw two cases of fever which were being treated for bilious remittent; on the 27th two more cases of fever, and on the 28th a third case. All of these cases were suspicious; but as it is a very serious thing to announce the presence of yellow fever, it was deemed prudent to await further developments. On the 2d of October two other cases presented themselves, but it was still deemed prudent to wait until I was positive. On the 3d the patient that I had seen on the 27th died with convulsions late in the afternoon. On the 4th the urine of the two persons taken sick on the night of the 1st, and whom I had seen on the 2d, showed the presence of albumen on being tested. One of these patients was in Tampa, and the other in Ybor, in the Cuban quarter. I was no longer in doubt as to the presence of yellow fever in Tampa, and on that night, the 4th of October, called the board of health together, and told them that yellow fever was in Tampa. My announcement was received, if not with incredulity, with many objections, on the part of the other members, on the ground that the city was very healthy, hardly anybody was sick, and that very few deaths had occurred, certainly not as many as might be expected in so large a population. The other members of the board (besides myself) present were not physicians, so that I felt that the whole responsibility devolved on me. The fever was not yet epidemic, and I knew that if the news should be put on the wires all opportunity for a great many people to get out would be cut off. I felt that it was my duty to depopulate the place by announcing the presence of the fever and urging the people to leave. To do this, and prevent the news being wired ahead of the fleeing refugees, I prevailed on the operator at the telegraph office to refuse to wire

any message conveying the news of the presence of yellow fever. I telegraphed, however, for Dr. King Wyly, the president of the Florida Health Protective Association, who came promptly.

After taking these precautions in the early morning of the 5th, I then gave out to the people in Tampa the unpleasant fact that yellow fever was here and advised them to get out. When Dr. Wyly came that day I laid all the facts before him, considering I had fully discharged my duty to the outside public, for the time being at least. None of the local physicians agreed with me, but claimed the disease to be dengue fever. As is usual in such cases the public is loath to accept the truth, but, nevertheless, a goodly number left Tampa on the 5th and 6th of October by rail. When quarantine closed up that avenue of escape many went into the country in this and adjoining counties by private conveyance. The exodus on the 5th and 6th of October was accelerated by one death on each day. The fleeing refugees, as is generally the case, greatly magnified the true condition of things in Tampa, and telegrams of inquiry came pouring in on the 6th which were not answered that day, as I deemed it important to get another train of refugees off that night; and besides in sending for and informing the president of the Florida Health Protective Association I considered that I had fully discharged my duty to most of the counties especially interested. At this time there were not over eight cases of sickness in Tampa, and the majority of these were taken sick on the 5th and 6th of October. For the succeeding week following the 6th the number of cases was not numerous, and no other deaths occurred until the 14th. With the people remaining in Tampa a reaction set in against the announcement made by me of yellow fever being in the place—not one of the other local physicians having as yet concurred with me—and I became the object of abuse and vilification for having ruined the town.

On the 7th of October I answered the telegrams of inquiry as to the presence of yellow fever in Tampa, stating that it was here, and also wired the same to the Surgeon-General of the Marine Hospital Bureau at Washington. On the 8th or 9th the mayor of Tampa wired Dr. Guitéras, U. S. Marine Hospital service, at Key West, to come over, and a day or so after parties here wired Dr. Joseph Holt, of New Orleans, asking him to send an expert. Dr. Holt replied that my having announced it as being yellow fever settled the question, or something to that effect. Dr. J. Y. Porter, of Key West, having tendered his services, reached Tampa on the 13th, and at once concurred with me as to the character of the fever. Still the people denied the disease being yellow fever, and were so outrageous in their abuse of Dr. Porter, as well as myself, that but for his sense of humanity and personal friendship for me the doctor would have returned to his home. These details are important as refuting the charge of concealment and correcting the false statements as to the origin of the yellow fever in Tampa of Dr. Joseph Holt, published in the New Orleans Times-Democrat of the 15th of August, 1883.

The fever continued to increase, and by the last of October had reached its culminating point. All of the local physicians except myself got sick, so that I asked for medical assistance, and Dr. George Tronpe Maxwell promptly responded.

After the arrival of Dr. Porter Surgeon-General Hamilton put him in charge of Government relief measures, which the governor had applied for. A Government hospital was erected, and soon filled with sick, mostly single men, who had no family connections to take care of them. By the end of November the disease had so far waned as to justify the closing of the Government hospital and the withdrawal of the relief measures. The local physicians having recovered from the fever, the visiting physicians returned to their homes. On the morning of the 20th of November the thermometer was down to 30° Fahr., and ice formed in exposed places. This cold snap was of short duration; the weather immediately moderated, with no subsequent frost. During December there was a considerable number of cases among those who came rushing back into town from temporary abodes in the country after the 20th of November cold snap, the popular impression being that one frost put an end to the fever. The city council then passed an ordinance prohibiting the return of refugees

until it should be deemed safe by the board of health, which, during all this time, practically consisted of myself alone. The city council repealed this ordinance about the 19th of December, and by Christmas most of the refugees returned. This action on the part of the city council was taken without consulting me. There were a very few cases, not exceeding three or four, in the outskirts and suburbs after the refugees returned. To the returned refugees my advice was to stay at home at night, refrain from visiting neighbors and going to church for some weeks, so as to avoid infection, which I thought would be most likely to be found in the clothing of church-going people until it had time to be aired by a few Sundays' use. On the 1st of January, 1888, I saw two cases 4 miles in the country, a mother and daughter, who had been absent from Tampa since the 6th of October, sick with the fever. Both cases proved to be yellow fever, the mother dying with uræmic convulsions and black vomit on the night of the 8th of January. Neither of these parties had been to Tampa since the 6th of October, and after a very careful investigation, the family having no motive to deceive me, I was forced to the conclusion that these two ladies had contracted the fever at a country party near their temporary residence, to which a family from Tampa went among whom there had been cases of yellow fever, and of course these latter had doubtless worn clothing from some wardrobe or chest of drawers in a room where there had been one or more cases of fever.

After these two cases I neither saw nor heard of any more cases until the last week in January, when I saw two mild cases in two young men, and was told by Dr. Jackson of a third case terminating fatally on the night of the 30th of January. The week previous a traveling opera company performed several nights in Tampa, which all these parties attended. Whether they contracted the infection from some one's clothing on that occasion I do not know, although the coincidence is worthy of mention. The two young men were engineers, and had been in Tampa daily throughout the epidemic. The fatal case was that of a lady who had returned to Tampa directly after the cold snap of November 20.

From this time on I neither saw nor heard of any case of the fever in or about Tampa until the 23d of April, when I saw a lady with the disease on the seventh day of her illness. This and another family lived on the outskirts of town, and there had been cases of fever in both families during the epidemic, although all the members of neither family were attacked. On investigation it was discovered that in the other family there had been several cases of fever attacking those who had escaped during the epidemic, and that this lady had been visiting this family and rendering assistance to the sick. This last mentioned family was poor and living in a small plank house pretty well excluded from the sun by oak trees, and nothing had been done with it in the way of disinfecting after the epidemic, so that I have little doubt but that the recent sickness in this family preceding that of the lady whom I saw was yellow fever. At any rate I had the mattresses destroyed, the bed linen and clothing disinfected, and the people moved into another house. The necessary disinfection was also done in the house where the lady was sick. There was no spread from this house, and so far as I know or can learn there was not another case of yellow fever in Tampa or vicinity until the 11th of July of the present year, when Mr. A. E. Waterman, a commercial traveler, sickened and died on the 21st of unmistakable yellow fever.

On the 4th of July, 1888, Tampa indulged in a big celebration, many people coming from the adjoining counties and some from distant parts of the State. There were probably two thousand visitors in Tampa on the 4th, many of these spending the nights of the 3d and 4th in Tampa.

Mr. Waterman came to Tampa on the 3d, went to Manatee on the 6th, and returned here on the 10th, was taken sick on the 11th, and died on the 21st. Hearing that there was sickness at Manatee I visited that place on the 17th, during Mr. Waterman's illness, to investigate, and immediately on my arrival was requested to visit a very sick lady, a young bride of only a few weeks, recently become a resident of

the place, whom I found dying of well marked yellow fever—well developed icteric hue of conjunctivæ and skin, albuminous urine, etc., no mistaking the character of the disease—and I understood that there was black vomit before death. I also saw three other cases convalescing from mild attacks of the fever. So that there was no doubt in my mind as to Mr. Waterman contracting the disease in Manatee. This view of the case is corroborated and strengthened by the fact that not a case of the fever was contracted in Tampa by any of the visitors to the 4th of July celebration.

I was called to see Mr. Waterman on the night of the 11th of July, and learned that he had had a chill about noon. On my visit next morning I found him dressed and in the parlor of a boarding-house where he was stopping. He complained of feeling badly, temperature 99° Fahr., pulse 80; said that he was going home on the train to Ocala that night, and would call and see me during the day. Not suspecting that yellow fever was at Manatee then, I thought no more of his illness, and supposed that he had gone home, when I was sent for again at night, the 12th, to see him. Found him with some fever and nausea, with vague pains in back and limbs. I saw him early the next morning, the 13th, and got a specimen of urine which contained a little albumen. Two acclimated nurses were at once put with the patient, and everybody excluded from the room. In the afternoon I found the albumen increased, and a still further increase the next morning, the 14th. The house was then vacated by all save the sick man and his nurses, and on the 16th everybody on that square and the square across the street were moved off, and the ends of the streets between the two squares boarded up. Everything from the patient's room was disinfected before being brought out of it. The two squares were cleaned up and disinfected, employing only acclimated persons for the work, and two acclimated guards were stationed to prevent people from coming about. After the sixth day, when the patient began to emit a very disagreeable odor, I had cheese-cloth tacked over the windows, and this was kept wet with a solution of mercuric chloride. After death the body was enveloped in a sheet wet with strong mercuric chloride, placed in a metallic case, and hurriedly buried. In fact, no precaution was omitted to prevent, if possible, the dissemination of the infection. The people who were in the house with Mr. Waterman from the 11th to the 14th, most of whom were unacclimated, and some of whom had been repeatedly in his room rendering little services in waiting on him during the night of the 12th, were quartered among acclimated families to await developments, having informed them if they left I would use the telegraph and have them taken up as suspects. But not any of these people contracted the fever from coming in contact with Mr. Waterman during the two first days of his illness. After the diagnosis was made in this Waterman case there was no effort made to conceal it.

A man named McCormick, a saloon-keeper and otherwise disreputable person, left Tampa by rail on the night of the 27th of July for Jacksonville. After he was gone a man of similar character came and told me that McCormick had left for Jacksonville sick with yellow fever. Dr. J. Y. Porter went to Jacksonville on the same train and returned to Tampa on the night of the 29th, when he told me that he saw McCormick in Jacksonville in consultation and that he had yellow fever. Knowing that McCormick had been the cause of a separation between a man and his wife, and that the husband had gotten possession of one of the children and sent them to Plant City to his mother, while the wife lived with McCormick, and that the separated wife was very anxious to get possession of one of the children, it was very natural to suppose that McCormick had made a nocturnal visit to Plant City for the purpose of abducting the children. The character of the man who told me that he had gone to Jacksonville with the fever was a circumstance in itself to make me believe that he had gone to Plant City, and that this man knew of it, or else why should he say that McCormick had the fever, and why should McCormick want to run off when his friend was confident that he had it? I still believe that McCormick went to Plant City in the night, and that the reason why he went off to Jacksonville when he was taken sick was because he knew that he would be unable to conceal it from me, and knowing that I had

traced Waterman's case to Manatee, he doubtless feared my being able to trace him to Plant City. A negro man in his employ made an affidavit that McCormick left Tampa one afternoon in a carriage and said that he was going to Plant City. But he was not seen by the guards at Plant City, and consequently no positive evidence of his having visited that place could be found.

After this no case occurred until the night of the 6th of August, ten days after McCormick left, when a policeman was taken sick and seen by Dr. Jackson. On the 8th two children were taken sick, and during that night three adults, making six cases in all. All these cases occurred in the eastern part of the old town, and within three blocks of the place where Waterman was sick, the windows of his room opening in that direction, and the prevailing wind for most of the time during his illness blowing in the direction of that quarter of the city where these cases occurred. The blocks are acre blocks, with 80-foot streets in that portion of the city. Since then I notice that Dr. Joseph Jones, of New Orleans, in his address at the Ninth International Medical Congress, states that an area of 1,500 feet must be disinfected on the occurrence of a single case, which would be a radius of 250 yards from the point where the case occurred. (Trans. Ninth Internat. Med. Congress, vol. 4, page 319.) According to this, my measures of disinfection did not embrace a sufficient area by a great deal; which requires, also, the fumigation of the houses with sulphur, white-washing of wood, and disinfection of drains, privies, etc., within that area of 1,500 feet. While entertaining the highest respect for Dr. Jones, than whom there is no better living authority on yellow fever, in my estimation, I must admit that I have become very skeptical about stamping out or preventing the spread of yellow fever when it gets into a place that has the "disposition," as Pettenkofer expresses it, for its spread. And even Dr. Jones, I take it, is not certain about preventing its spread by the measures he recommends; for in the appendix to his address, page 331, he says: "Whoever may be instrumental in the discovery and establishment of the laws which govern the origin and spread of this great scourge will certainly be entitled to the gratitude of the inhabitants of insular, tropical, and sub-tropical America." Coming from such a distinguished man as Dr. Joseph Jones, who has not only had a great deal of personal experience with the disease as a physician and president of the Louisiana board of health, but who probably has no superior in this country as a microscopist, chemist, and scientist generally, and as such has laboriously investigated this disease and hunted its supposed germs, one can not fail to be impressed with the paucity of our positive knowledge concerning it in all respects.

Several other cases occurred in the same neighborhood on the 11th and 12th of July, and the disease became epidemic all over the city; although there were not exceeding 300 or 400 unacclimated people in the place, according to the best estimate I could get from a hurried census by the city authorities made at my request. Among the first cases there were three deaths, two occurring on the 13th and one on the 14th of August. After the first cases in August the disease assumed a remarkably mild type, as a rule, among the resident population; and in September it became so mild and insignificant as to almost induce me, in compliance with popular pressure, to declare the fever at an end. From the 14th of August to the 24th of September no death occurred. This last victim was a Catholic priest who had been in Tampa about two weeks, when he sickened and died on the fifth day of his illness of uraemic poisoning, having the icteric hue very marked. He had spent several years in Africa and was with Chinese Gordon at Khartoum, and was thought to have been the last white man who saw that famous soldier. His name was Dennis O'Sullivan, and he was a very large man of fine physique. In October there were two deaths from yellow fever, while November gave four victims to the same disease. For the whole season, from the 7th of August to 1st of December, there were ten deaths from yellow fever in Tampa and immediate vicinity, one death being a short distance outside of the incorporated limits.

After the first cases in August the fever seemed to have lost its malignancy as to the resident unacclimated population. With strangers coming in and those who ran out

on the first alarm and returned after a month's absence, it was much worse; and with the exception of the first three deaths in August the deaths were confined to these two classes, strangers and returned refugees. Nearly all the refugees returned in the latter part of September and first part of October. Taken as a whole, the epidemic was extremely light, both as to numbers, from lack of material, and as to gravity of cases. Some of the physicians only reported such cases as had albuminous urine, while others reported none, claiming everything to be dengue, so that I do not know how many cases there were. In the beginning of the epidemic of this season I saw some cases which were evidently not yellow fever, and which were probably mild dengue. These cases occurred in persons who I know had yellow fever last year, and in others who, being unacclimated, had genuine attacks of yellow fever subsequently. Few authors agree in their description of dengue fever, nor have any of their descriptions of the disease coincided with my observations in four epidemics of the disease. I have never seen the joint affections in Florida, and the eruption and secondary fever have not been common in my observation. Besides, the use of antipyrin in fevers of late may lead to mistakes in favor of the dengue theory, as this drug not unfrequently produces a roseola-like eruption. It is claimed that the drug is not pure when it produces this effect. At any rate it is easy to see how mild cases of yellow fever if treated with antipyrin may be mistaken for dengue in many instances. No doubt many of the cases of a very mild type, which I consider yellow fever, would be termed in endemic yellow-fever countries "acclimating fever." Counting in this latter class of cases I think the approximate number of cases in Tampa this summer would be near three hundred. None of these fevers were malarial, running their course of one to three days, and recovering without quinine. The Cuban population had, of course, no yellow fever, and escaped also the so-called dengue. There was only one death in their quarter of the city from yellow fever, and that was an American who had been in Tampa only a few weeks when taken ill.

On the 12th of August, 1888, the president of the board of health officially announced the presence of yellow fever in Tampa, and the following day established local quarantines in the county against Tampa. Of course all places, even Jacksonville, promptly quarantined against Tampa. Local quarantines to protect Tampa from yellow fever were discontinued the 15th of August. Port Tampa, the terminus of the South Florida Railroad, on Old Tampa Bay, 9 miles southwest from Tampa, quarantined against Tampa, and all intercourse prohibited except under the supervision and sanction of the president of the board of health. The trains carrying the United States mail ran through Tampa without stopping, except for a few minutes to put off and take on the mails.

Knowing that the number of unacclimated people in Tampa was comparatively small, and believing, from what I had observed in July at Manatee, that it would be mild, I did not advise the people to leave the place, consequently comparatively few left, and the most of them returned in September and October. Fortunately, however, for Tampa, the construction of a large brick hotel had been begun in May, and when consulted, on the breaking out of the fever, as to the propriety of continuing or discontinuing work, I encouraged its continuance, and the same I did as to laying pipes for water-works, and thus a considerable part of our laboring population found employment, and saved Tampa from having to apply to the charitable for means to feed the laboring classes. The cigar factories kept going, although this industry was seriously imperiled by the senseless quarantines against even cigars; even the steamers from Galveston, Tex., to New York were prohibited by Galveston from taking Tampa cigars on at Key West, so that for a few weeks we were threatened with having several hundred cigar-makers thrown out of employment.

SEFFNER AND MANGO.

Seffner is a railroad station on the South Florida Railroad, 12 miles from Tampa, and Mango is on the same road 2 miles nearer Tampa. Both last year and this there were a few cases of fever at Seffner in persons who had left Tampa in the incubation

stage, but no spread of the disease followed. It was quite a refuge station last year and there was no restriction on intercourse between Seffner and Tampa at any time. It was, moreover, the change station for the railroad during last year, no trains coming nearer Tampa. This year all of a family of seven went out to Seffner and were sick except one, within a few days after removal. In the course of a month this family returned to Tampa, and the one who was not sick at Seffner was sick in Tampa, the remainder of the family escaping it in Tampa after their return. There are several stores, two boarding-houses, with a population of seventy-five or a hundred people at Seffner. The place is on elevated ground, with fair natural drainage into a large savannah some 300 yards to the east, yet as before stated, notwithstanding the fact that persons contracting the infection in Tampa were sick at Seffner there was no spread and not a single indigenous case in the place. Seffner is 12 miles this side of Plant City.

Now, Mango, 2 miles this side of Seffner, and 10 miles from Tampa, with a population of not over thirty inhabitants, affords a very different history. Although no cases of the fever occurred in Mango last year, there were quite a number of cases among the resident population of the place this year. On the 21st of August a woman from there came to Tampa and visited in a house where a patient had recently been sick with yellow fever. She returned to her home in Mango the same day, and the fourth day afterwards was taken sick and was sick three or four days. As she convalesced her husband took sick and had a well-marked case of yellow fever—in fact was very ill, had the characteristic color and albuminous urine. There were several other cases in the same family and in those who visited the sick, so that nearly the whole population had the fever. Fortunately it was of a mild type generally, and no deaths occurred. In this little place the necessary conditions for its spread were evidently present, while they were wanting in Seffner. I had the surrounding country and Seffner warned of the presence of the fever in Mango, which was sufficient to keep the people away from the place. While unable to explain such capriciousness in spreading as yellow fever sometimes manifests, I deem such facts as presented by these two places in regard to that point worthy of mention. And I have not the slightest doubt that inland quarantine gets the credit for keeping out yellow fever in many instances, when in fact the escape of such places was entirely due to the absence of certain unknown factors or conditions necessary for its spread, the lack of "disposition" as Pettenkofer puts it. This same capriciousness as to spread by yellow fever was noticed in the great epidemic of 1878. "Some of the towns, although strictly quarantined, and in the highest sanitary state, were devastated, while others without any apparent reason were spared. Along the river and railroad lines the pestilence showed extreme capriciousness."

The whole number of cases in Tampa and vicinity in 1887 was probably in the neighborhood of one thousand, a little over than under probably, with about one hundred deaths. In a great many instances the cases were so mild as not to require the services of a physician; and among a negro population of about five hundred there were only three deaths. I should estimate that at least three hundred of them had the fever, the remainder having been acclimated in previous epidemics in Tampa.

The Government relief measures rendered Tampa last year were under the charge and supervision of Dr. J. Y. Porter, and consisted in providing a hospital with medical attention, food, and medicines for the sick sent to it; the pay of a considerable number of nurses to assist in taking care of the sick unable to pay for nurses throughout the city. The county board of health expended about \$300 in supplying bedding and furniture to the Government hospital.

In the present season the United States Government has expended in the neighborhood of \$200 in Tampa for the destruction of bedding, disinfectants, and pay for nurses, these being required in only two instances at public expense. In July, during the illness of Mr. Waterman, the county board of health incurred liabilities to the amount of \$500 in moving people from the vicinity, cleaning up premises, and disinfecting the same and all the houses on the two blocks.

YELLOW FEVER AT PLANT CITY.

One of the many refugees who left Tampa October 5 and 6, 1887, was taken sick at a small hotel in Plant City on the 7th October. The case seemed to have been mild and attracted no attention at the time, the attending physician calling it dengue.

After this it appears that there occurred in the same hotel as many as ten cases during the month. On the 14th day of November a man died in the hotel with black vomit; and on the 15th November Dr. Porter and myself visited Plant City at the request of the mayor, to investigate and determine the character of the sickness which had been prevailing in the hotel. We were not long in declaring it to be yellow fever, and advised such measures to be taken by the town authorities as we deemed necessary to prevent its spread from the hotel where it appeared to be confined. As is customary under such circumstances, the citizens of a place are loath to admit the presence of a contagious or infectious disease, and so it was in this case, and nothing was done to stamp out or prevent the spread of the disease. By Christmas the infection had gotten into other houses, and one or two more deaths had occurred from this fever. Two out of the three local physicians pronounced it malarial fever, and the other local physician could not stand the popular pressure in persisting that it was yellow fever. On the 31st of January, 1888, I was called to Plant City to see a patient in consultation, whom I found sick with yellow fever; and on that occasion saw three other cases of the disease. I had not visited Plant City since the 15th of November, as already related. Cases of the fever continued to occur, and in March Dr. R. D. Murray, Surgeon Marine Hospital Service, visited Plant City while on a tour of inspection in the State, and found one or more cases of the fever in Plant City. At my earnest solicitation, Dr. Murray spent three days at Plant City in efforts at disinfection, cleaning up, etc., at an expense of about \$300 to the county board of health. At his departure there was one case on hand which terminated fatally on the 23d of March. After the death of this last patient no new cases occurred for about fourteen days, and I indulged the hope that Dr. Murray's efforts to rid the place of infection had proven successful. At no time so far had the number of cases been numerous or so generally diffused as to justify its being considered epidemic. On the other hand, it appeared to me that the infection was spread from house to house by visiting and waiting on the sick; and thus it lingered along until the middle of April. (On account of unmerited popular abuse I resigned from the board of health early in January, as soon as the epidemic was over in Tampa, but accepted the position again in April at the request of the governor, for the special purpose of making an effort to get rid of the infection at Plant City.) On the 24th of April the board of health convened in Plant City, and began active measures to get rid of the fever. Many of the unacclimated in the place were induced to move out, and a destruction of all infected beds and mattresses was ordered and carried out. Houses were disinfected by sulphur fumes and washing of walls with mercuric chloride solution, premises and privies with chloride of lime, etc.; bed linen and clothing by immersion in disinfecting solutions and the process of the laundry and fumigation. In short, everything was done that it was possible to do under supervision of two local physicians, whom, at my request, the governor had appointed members of the board of health. Some \$1,500 worth of bedding was destroyed, and disinfectants and labor cost over \$500. The population of the place was about 300 people at its best, and hardly covered an area of 40 acres. By the 12th of May the process of destruction and disinfecting was completed, and the last case had terminated in death on the 11th of May. From this time no cases occurred until about the middle of June when the unacclimated began to return. One family of returned refugees had not been at home but four days when the fever broke out in it, all the members being attacked almost simultaneously, and the head of the family died of yellow fever on the 22d of June. It seemed now to take on an epidemic form from atmospheric infection, and some of those who visited the town and remained for a short time, especially if delayed a little into the night, contracted the fever and

were sick at their homes in the country. The board of health had the trains run through the place without halting or stopping, and all communication with Plant City was cut off. The citizens of the place became very indignant, and for a week or two the relations between Plant City and the president of the board of health were, in diplomatic parlance, rather strained. By the 9th of July the discontent at Plant City was somewhat quieted down, and twenty guards were employed from among the citizens of the place to isolate the place and keep the people in and out, most of the remaining unacclimated were removed out to a refuge station, and after a detention of fourteen days, and fumigation of what little baggage they were allowed to take, permitted to go to other places, the railroads kindly furnishing the transportation. On the reappearance of the fever in Plant City in June, the governor, when notified of the fact, sent the board of health \$500, and in July sent \$1,000, all of which was expended at Plant City in feeding the destitute, for everybody's means of making a living was cut off, taking care of those in quarantine and paying guards from the 8th to the 23d of July, when the Marine Hospital Bureau took charge by order of the President at the request of the governor.

As early as the 3d of July, when the people of Plant City appeared in their worst mood, I wrote a letter to the governor suggesting that he apply to Washington for aid. Before mailing this letter I received a dispatch asking me to meet the late Col. J. J. Daniel, of Jacksonville, that night at Lakeland, and that Colonel Daniel wished to confer with me about Plant City. At the conference Colonel Daniel's idea was that I could manage Plant City if supplied with means, and an abundance of these he promised if I would only remain in charge. He expressed a desire that for the present, at least, I would not send the letter I had written to the governor, suggesting that aid be asked from Washington. I did send the letter, but asked the governor to consider that part withdrawn relative to calling on Washington for assistance. I now addressed myself to conciliating Plant City, and so far succeeded by the 7th that on the morning of the 8th of July I had another conference with Colonel Daniel, and laid before him my programme of procedure, which, after a full and free conference between Dr. R. P. Daniel and myself, was approved by Colonel Daniel and pecuniary aid promised again. Soon after, the 9th, the guards were employed as before stated. About this time a number of unacclimated people moved out, among whom five cases of fever developed in the course of a few days, and three of a family of four ladies died in the course of two weeks. Cases of the fever also occurred in the unacclimated who remained, but as the number of this class was small and the entire remaining population did not exceed one hundred and fifty persons, the cases were not numerous; and so by the end of July the disease had pretty well run its course, there still being an occasional case as late as the 21st of August.

In the mean time I had discovered the fever at Manatee on the 17th of July, of which I had promptly informed the governor by letter; and on its receipt he wired me, asking if I did not wish aid from Washington. I replied in the affirmative to the governor, and also informed Colonel Daniel of the condition of things at Manatee. On the 20th Surgeon-General Hamilton wired me, asking me if I would take charge of Government relief measures in Hillsborough County, to which I assented, and on the 21st he placed me in charge, as agent of the Marine-Hospital Bureau in Hillsborough County. And on the 23d the Marine-Hospital Bureau assumed control at Plant City, through me as its agent. Early in August under direction of Surgeon-General Hamilton every dwelling, outhouse, and privy was fumigated with sulphur, and in doing this one dwelling, with its contents, caught fire and was destroyed. Besides paying for twenty guards from the 23d of July to the 30th of November, the Government paid several hundred dollars for disinfectants and fumigating, and for all bedding infected and destroyed after the reappearance of the fever in June. The county board of health spent about \$2,000, the State \$2,000, and the Government near \$6,000, making a grand total of something like \$10,000, in trying to get rid of yellow fever in Plant City, and preventing its recurrence there after it broke out in Tampa. After the 1st of October the unacclimated were allowed in the place from 9 a. m. until 4 p. m., when they had

to leave and not remain in the place during the night. No one contracted the fever by thus going in, and it is possible that the place was free from infection; but as, unfortunately, an unacclimated person is the only re-agent by which it can be tested, it was deemed prudent to keep the unacclimated from taking up a permanent residence in the place until the 1st of December, when the guards were discharged and all local quarantines in the county were removed. Besides, to have thrown the place open earlier, even had I known that time had freed the place from infection, the place would soon have filled up with unacclimated people and the risk of renewing the infection from Tampa would have been incurred.

When it was deemed necessary in the latter part of June to isolate Plant City, unfortunately my two medical conferees on the Board did not agree with me in adopting the stringent measures which I deemed necessary and put in force, and their opposition had much to do with creating dissatisfaction among the people. Under the circumstances I was constrained to appeal to the governor to either relieve me or remove them, and they were promptly suspended. Both are clever gentlemen and good physicians, and have rendered efficient services since, in the employment of the Government, at Plant City and Palmetto. Both, I am happy to say, became convinced by the course of events that I was correct, and our former pleasant personal relations were restored.

Plant City is located on the South Florida Railroad, 22 miles east from Tampa and 10 miles this side of Lakeland, a town of about the same size as to population. Its site is in a fairly fertile, productive pine country, much broken with shallow ponds and wet-weather streams fringed for a hundred feet or so on each side with swamps. It is near 100 feet above sea-level and has fair natural drainage. Like Lakeland and all the other towns on the South Florida Railroad from Tampa to Kissimmee, it has sprung into existence since 1883, and therefore its existence only dates back four years. Before the building of the road, which was opened for traffic in the spring of 1884, most of the site of the town was a farm. The surrounding country had been settled, although not very thickly, for nearly forty years and possessed a very fair reputation for healthfulness. Occasionally a little malarial fever of the intermittent type made its appearance in the summer and fall, and constituted about all the endemic sickness of that section. Plant City built up early in 1884, and as early as May and June a continued fever appeared and caused a few deaths. The local physicians called it typho-malarial fever, but having an opportunity to make an autopsy in Tampa the same season in a case of the same character of fever which was prevailing in Tampa also, I found the lesions of typhoid fever. (Not a great while afterwards I had an opportunity of exhibiting intestinal specimens to Dr. John Guit  ras, of the Marine-Hospital Service, and he pronounced the lesions those of typhoid fever.) So I have no doubt of that fever having been typhoid, though none of the cases in Tampa or Plant City presented typical symptoms. During 1885 and 1886 Plant City was healthy, and so continued until the appearance of yellow fever there in October, 1887, and since then the place has been perfectly healthy, except for this specific fever, and the acclimated living there throughout the season have enjoyed excellent health. Not a case of malarial fever has been reported; so that the current report that Plant City is a naturally sickly place has not an iota of foundation in fact. The fever found a suitable habitat in Plant City and took hold, and that it never got to Lakeland, only 10 miles away, with almost daily intercourse, and communication from Christmas until the latter part of June, is only to be explained on the hypothesis of Pettenkoffer, the lack of "disposition" to take it, for I have not the slightest doubt of there having been a few cases in Lakeland, though of a mild type.

The southern extension of the Florida Railway and Navigation Company has its terminus at Plant City, having been completed to that point in 1887.

The total number of cases in Plant City from October, 1887, till in August, 1888, was one hundred and fifty-nine, with sixteen deaths; and the number of cases in the

adjacent country during the same time, the disease having been contracted in Plant City, was sixteen, with seven deaths, making the total number of cases in Plant City and adjacent country one hundred and ninety-one, with twenty-three deaths. It is to be noted that it did not spread to other members of the family, in the country, from a case contracted in Plant City.

FEVER ON MANATEE RIVER.

Manatee River, in the county of the same name, rises in the interior and, flowing westward, empties into Tampa Bay, about 45 miles south of Tampa and 7 miles from Egmont Key. For some 10 miles from its mouth it is very broad; and is, in fact, an estuary with flow and ebb tides. Its banks are, however, free from swamps and marshes, though the country is flat and has an elevation above sea-level of from 15 to 20 feet. Several village settlements are located on both sides of this river. Palmetto and Ellenton are on the north bank, Palma Sola, Fogartyville, Braidentown, and Manatee are on the south bank. Manatee is incorporated as a town. Braidentown is the county seat. Manatee is about 6 miles above the mouth of the river, and is the oldest settlement on the river. The soil of the Manatee River section is sandy, with the exception of some large bodies of hummock lands lying on both banks of the river above and opposite Manatee town. All these different places on the Manatee River are rather scatteringly built up. Manatee town has a population of about four hundred, Palmetto about two hundred, while that of the other places may be from fifty to one hundred.

A little girl that went from Tampa to Manatee on the 4th of October, 1887, was taken sick a day or two after reaching Manatee. Other cases of sickness in the house where this girl had been sick soon followed, and in the course of a month there had been quite a number of cases in Manatee and several deaths. The same kind of sickness, it appears, prevailed also more or less at Braidentown in October and November. From October till Christmas there were probably sixty or more cases, with some seven or eight deaths. The local physicians of Manatee and Braidentown never admitted, however, that it was yellow fever, and therefore it is impossible to do more than make approximate estimates from hearsay. During the winter and spring there were not many cases; and from all that I can learn I presume that it followed about the same course that it did in Plant City. The local physicians denying that it was yellow fever, the infection was kept alive throughout the winter and spring by visiting the sick, with the result of some one occasionally, in the proper personal state, or having the personal "disposition," as Pettenkoffer terms it, contracting the disease from the infected room. That Manatee town was free of it for any length of time during the winter and spring I have many reasons to doubt, while I have assurances that there were cases of fever at short intervals all along until I saw cases of the fever in Manatee July 17 of this year, when it appeared to have but recently become epidemic. On the 24th of July Dr. R. D. Murray, Surgeon Marine Hospital Service, went to Manatee and took charge of Government relief measures. He placed a cordon of guards around the place and instituted measures of disinfection, and by the 1st of September the disease had run its course.

In August the fever appeared in Palmetto, notwithstanding a very rigid quarantine against Manatee from the 18th of July. The first victim was an invalid lady who had not been from home for months, and consequently could not have contracted the infection in another locality. The disease did not appear to become fully epidemic until about the middle of September, and the mortality was considerable for so small a place.

In Manatee the mortality was very small this season, one death in July, a recent resident, whom I saw, and one in November.

There was also one death from yellow fever in the country a few miles from Manatee, who visited Manatee and probably contracted the disease in the place. There-

were eight or ten deaths in Palmetto out of between eighty and one hundred cases, the last death occurring on the 24th of November.

Cases of fever were also reported at Braidentown, but there were no deaths, and the attending physician, who has denied all the time the existence of yellow fever, pronounced it dengue.

Dr. Murray left Manatee the 4th of September, leaving Dr. M. B. Harrison in charge at Palmetto, where there were only a very few mild cases under treatment at the time. On the appearance of the fever in Palmetto a large proportion of the unacclimated left the place, and on the recovery of the few sick fumigation of houses and disinfection was resorted to. After an absence of a week or so those who had left returned, and the fever as promptly returned also. By the middle of September the cases in Palmetto and surrounding vicinity had become so numerous—Dr. Harrison being among the sick—as to induce the board of health of Manatee County and the citizens of Palmetto to apply to me for medical assistance. A physician was accordingly sent them from Plant City on the 22d September by authority of Surgeon-General Hamilton, who remained till the 15th of October rendering medical services to the citizens of Palmetto and adjacent country. The board of health of Manatee County earnestly seconded Drs. Murray, Harrison, and Wells—the latter being the physician sent—in their efforts to prevent the spread of the disease. How much was spent by the board of health and by the Marine Hospital Bureau at Manatee and Palmetto I do not know.

That the yellow fever hibernated in Plant City I know to be a fact beyond dispute; and that it did so likewise at Manatee I am fully convinced from the evidence afforded by my investigations; and that there was a case on the outskirts of Tampa in April, taken sick on the 17th, and seen by me on the 23d, I know to be a fact. That this fever at Plant City and Manatee, and the case in Tampa in April, was not the result of fresh importation of the disease or its poison, is another unquestionable fact. If there were any other cases of yellow fever in or about Tampa from the last of January till the Waterman case in July I was ignorant of it, notwithstanding I exercised the greatest vigilance and allowed no case of fever that came under my observation to escape the closest kind of scrutiny as to its character. It is possible, however, that there may have been other cases, for the case in April was seen by me by accident, as it were; driving by with the attending physician, who invited me in to see the patient, when I recognized the character of the disease, which the attending physician had not suspected. This patient had been taken sick on the 17th, and was first seen on the night of the 20th by the physician, so that the first fever had passed off before his visit. She was complaining principally of sore throat and was suffering from a slight hemorrhage from the mouth, by no means profuse, and had a very slight icteric color of eyes and skin. On questioning the patient she gave a very clear history of an attack of yellow fever chill, violet frontal headache, pain in the back and limbs, with much nausea, retching, and vomiting. The urine on examination was found to contain plenty of albumen. After this case I was more on the alert than ever, but neither saw nor heard of any other case. The occurrence of this case, though not heralded to the world, was not concealed from certain health officers outside of Tampa, to whom I verbally communicated the facts.

That yellow fever has hibernated at Tampa and Fort King, in the vicinity of the present town of Ocala, before, we have on the authority of Dr. Drake, as quoted by La Roche, volume 2, page 294, though it has never done so before within my knowledge as boy and man. It prevailed in Tampa in 1853, 1858, 1867, and 1871 in epidemic form, and on none of these occasions was there any hibernation till the following season. As a physician I had only to do with that of 1871, since when Tampa has been free from this disease till last year. In 1871 it was brought to Tampa from Cedar Keys, and also carried from the same place to Gainesville.

Last winter the coldest snap experienced in Tampa was the morning of the 20th of November, when the thermometer was down to 30° Fahrenheit, but there were numerous cases of the fever after that. The winter on the whole was a mild one; and at

Plant City, in February and March, my observation was that a cool spell seemed to develop new cases, a circumstance also mentioned by La Roche: "Cool weather, therefore, when the disease is fairly established, so far from diminishing its extension, actually increases it. These facts have been noticed in our Southern States as well as here, and at Barcelona in 1821." (Volume 2, page 109.)

YELLOW FEVER AND FIRES.

It is deemed worthy of remark that in the spring of 1886, Key West suffered from a very extensive conflagration, which destroyed all the houses on several blocks. In Tampa, in the spring of 1886, there was also a fire destroying half a block, and again, in August, 1887, a still more extensive fire, destroying all the houses except three, on two blocks in the heart of the old part of the city. On both sides of the street separating these two blocks it was closely built up with wooden houses, which were used for grocery stores, fruit shops, bar-rooms, restaurants, and other small businesses, and was the most densely populated section of the town. It was the general resort for the idle and loafing class, and had defied all efforts to keep it in a good sanitary condition. There was considerable human excreta left exposed where the privies, a little distance in the rear of the houses, had been burnt.

These facts as to the fires in Key West and Tampa are mentioned not as causes of the yellow fever in these two places, except as far as their occurrence may have favored the conditions upon which the spread of yellow fever depends. That epidemics of this disease have followed conflagrations in cities before are facts to be found in the medical literature of the subject, and hence worthy of note in the epidemic of 1887.

The question of the contagiousness of yellow fever has been in dispute for the last century. There have been contagionists, contingent contagionists, and non-contagionists, and much evidence has from first to last been collected and advanced in support of the theories or views of these factions. Recently I noticed in a newspaper article that the term "miasmatic contagion" was brought forward by a distinguished yellow fever physician. It is probable that this is only a new name for contingent contagion. My own personal experience is against the doctrine of contagion *in toto*. I beg to refer the reader to Pettenkoffer's views on "Zymotic diseases and quarantine," as given in the Journal of the American Medical Association of November 24, 1888, as pretty fully expressing my views on those subjects.

The problem of keeping yellow fever out of the United States has exercised the best intellects of the country for a century, with nothing very definite in that direction accomplished. Our ever-increasing commercial and personal intercourse with insular and tropical America has not especially increased the risk of introducing yellow fever, for the reason that there is a great difference in the commercial marine of the present day from what it was fifty years since. The slow-sailing vessel has given place to the well-built and fast-going iron steamer, and much risk is avoided by a shorter stop in the infected port. The southern ports can not afford to be hermetically sealed for six months in the year, and especially in sight of what the near prospective future will offer them in the way of commerce when the Panama and other projected canals shall be completed across the Isthmus. Even if we admit that absolute non-intercourse is the only certain safety, and this were either possible or practicable, it would be a greater misfortune than yellow fever.

But if non-intercourse should be attempted by law it would be bound, in the very nature of things, to prove a failure. It would be impossible to prevent communication between Havana and Key West, and between the latter place and places on the Gulf coast. Whenever the cupidity of man is sufficiently stimulated by the hope and prospect of gain, no statutory enactments are going to deter him from taking the risk of violating them; especially when a large proportion of business men look on quarantine as a hindrance to business and an almost useless expense, as judged by its advantages.

The country is well aware of the fact that a United States armed blockade did not keep it out of Wilmington, N. C., in 1862 nor out of Charleston, S. C., in 1864; nor out of New Berne, N. C., in the same year; and General B. F. Butler admits, in the November number of the *North American Review*, 1888, that a case of the fever got into New Orleans in 1862, when he was governing that city with martial law, and controlling the quarantine himself, with the penalty of death staring the quarantine physician in the face, if a case of fever should reach the city through the quarantine.

There is hardly a year but that there are one or more cases in the city of New York, introduced by shipping after going through the New York quarantine; and in one instance, that of the *George Gibson* case in 1884, after first going through the Delaware breakwater quarantine, and then being subjected to treatment at the New York quarantine. No quarantine, maritime or land, can be perfect; and with the absurd ideas of many of the present day as to the indefinite perpetuity of yellow-fever infection in goods, nothing short of absolute non-intercourse on the part of the whole country, North and South, can be resorted to to insure absolute safety from the introduction of yellow fever. Suppose all the travel from yellow-fever countries should be compelled to enter the United States through New York, would that afford any guaranty that those having business in the yellow-fever zone would not introduce the disease in baggage? New York does not seem to be provided with any special disinfecting apparatus. Besides, what has happened before is possible to happen again; and it has been only sixty-six years since New York suffered from her last epidemic of yellow fever. This long exemption does not prove that she will never have it again. Up to 1850 the disease had been long absent from Rio de Janeiro, and at one time it was so long absent from Vera Cruz as to have almost got beyond the memory of man. The same in Havana; for years before 1761 it had not been known.

The laws governing the origin and spread of yellow fever are no better understood now than they were in the early part of the century, and this is admitted by every man who has had anything practically to do with the disease.

The period of incubation appears to be from one to three days, as a rule. Where that period appears longer, it may be owing to the fact of the party having the infection in his baggage or clothing. The infection is more apt to be carried in the clothing of females from the sick room than by that of men, for obvious reasons as regards clothing; and then, again, female visitors are likely to spend more time in the sick chamber. There is not much risk of the physician carrying the infection in his clothing from the sick chamber if he does not unnecessarily prolong his visit, avoids contact with the bed, and takes a little pains as to airing before visiting the unacclimated.

THE YELLOW FEVER AT FERNANDINA.*

U. S. MARINE-HOSPITAL SERVICE, OFFICE OF SURGEON IN
CHARGE GOVERNMENT RELIEF MEASURES,
Fernandina, Fla., October 27, 1888.

SIR: I have the honor to make the following report upon the origin and course of the present epidemic of yellow fever here:

Fernandina is a port of entry on the Atlantic sea-board, at the extreme northeastern corner of Florida. The town, situated upon the west side of Amelia Island, near its upper end, has a population of about 3,500, of whom 1,500 are whites. Amelia Island, running nearly north and south, is about 17 miles long and 2 miles broad. Barring yellow fever, Fernandina is a remarkably healthy place, notwithstanding its low latitude and marshy surroundings. Its comparative immunity from malarial disorders is largely due to the prevailing sea-breezes and to the fact that the town is kept very

* By J. W. Ross, Surgeon, U. S. Navy.

clean. As yellow fever is to me clearly a fecal disease, I believe that had Fernandina a good system of modern underground house sewerage, as it might easily and inexpensively have, instead of its present poorly-managed earth-closet arrangements, the place would be practically yellow-fever proof. Prior to the present there has been only one yellow-fever epidemic here. It occurred in 1877 and was quite severe, somewhere near fifteen hundred cases, with one hundred and twelve deaths. As nearly all susceptible persons then here had the disease, and comparatively few whites have moved in since, there has not been a great deal of his favorite pabulum for Yellow Jack to prey upon this year.

Of the practicing physicians here, four, Drs. Pope, Starbuck, Palmer, and Horsey, are regular, and one, Dr. Frazer, a homeopath. The four regular physicians are long time residents, and the three first-named practiced here in the epidemic of 1877. Dr. Frazer came here from Michigan some two years ago in delicate health. About 8 miles south of the town, on Amelia Island, lives an old retired physician, Dr. Robert Harrison, who, when in practice, stood very high professionally and otherwise. Even now, after his long retirement from practice, he is looked upon by those best able to judge as an authority in medical matters. In the epidemic of 1877, when Dr. Pope called it yellow fever and others differed with him, Dr. Harrison was brought in by the mayor to decide the matter, and when he agreed with Dr. Pope yellow fever was immediately proclaimed. During the last month I have seen much of Dr. Harrison, and have found him, while entirely unassuming, a man of strong character, clear head, sound judgment, and possessed of the courage of his convictions. He has had very intimate acquaintance with yellow fever at Charleston, Cedar Keys, Jacksonville, and Fernandina. Since quitting practice he has devoted himself to hunting and fishing, coming into town only semi-occasionally. The negroes of the settlement near him, called Harrison's, are many of them his former slaves and their descendants. They and many others of their race in and around Fernandina go to him with their ailments. He says he tells them as well as he can what the matter with them is, what to do, and when they are seriously ill goes to see them. As he is admirably situated and equipped for forming intelligent independent opinions in medical matters, I have found his acquaintance not only pleasant but very profitable.

After a very careful investigation and the collection of a large mass of facts and opinions, some of which will be given below, I am forced to conclude concerning yellow fever here this year:

First. That it was brought to Fernandina from Jacksonville.

Second. That it has been here since the second week of August.

The evidence seems conclusive that there was a considerable amount of yellow fever in Jacksonville about the 1st of August. I can not but concur with the physicians who believe that the case of McCormick, which was recognized there about the 27th of July, was by no means the only one then in Jacksonville, and that the disease became epidemic from the unsuspected cases. Dr. Posey has shown that a man who went from Jacksonville to Macclenny "previous to or about the 1st of August," started the present epidemic at the latter place.

The relations between the people of Fernandina and Jacksonville have always been extremely intimate. Many families are divided between the two places, some members living in one and some in the other. Several prominent business men were residing here and transacting their business in Jacksonville, going back and forth morning and evening, the time by rail being only seventy-five minutes, the distance 37 miles. The Fernandinians did habitually a great deal of their shopping, especially in dry goods, at Jacksonville. On Sundays so many people would come here from Jacksonville that special excursion rates were habitually given on those days. Circumstances immensely increased this intermingling of the two communities just before yellow fever was, on the 8th or 9th of August, announced in Jacksonville. Much rivalry had existed between the base-ball clubs of Fernandina and Gainesville.

After several exciting contests between the two teams, a final decisive series of

games were played by them at Jacksonville on the two last days of July and the first day of August. Feeling ran so high here on the occasion that to witness these games the Fernandinians went to Jacksonville almost en masse. Many who did not care for base-ball, taking advantage of the cheap excursion rates, went over on business or pleasure. The negroes, who are so gregarious and extravagantly fond of excursions, turned out in full force. A few days after these games a Jacksonville team came over here and played against the Fernandina team. When it became an open secret that yellow fever was about to be pronounced epidemic in Jacksonville the Fernandinians then over there came home pell-mell, and with them many Jacksonville people fleeing from danger, bringing along their trunks and other baggage. I knew of quite a number of Fernandinians who brought back with them dry goods, ready-made clothing, etc. It would have been strange, indeed, had not some of these people brought the contagium of yellow fever to Fernandina in fomites or in their own bodies. It may be well to give a few instances emphasizing this. Two young men, residents of Fernandina, named Simmons, were in Jacksonville at the death, August 6, of their niece, Frankie Thebant, who had what the family then suspected, and now firmly believe, to have been yellow fever. One of these gentlemen remained to attend the burial of the little girl, August 7. (The evening of the following day, August 8, official announcement of the existence of yellow fever in Jacksonville was given to the press.) Being a member of the Fernandina Volunteers, he went thence to the State encampment for a few days and reached his home in Fernandina just five days after the burial of his niece. A well-known citizen of Fernandina, who has asked me to withhold his name, attended the base-ball games at Jacksonville about August 1. He states that on August 5, three days after his return, he was taken with a fever which lasted two or three days, and left him so weak that he could not go back to his work for a fortnight. He told his employer at the time that he felt exactly as he had felt when he had yellow fever in 1877. Said employer repeated this to me, whereupon I looked the man up and got his statement of the matter. He was an unwilling witness, however, like most others here, and his story is, to say the least of it, not an overstatement. He had no physician. He said also that his son and daughter in the course of the subsequent one or two weeks had each an attack of fever with headache, pains in the bones, etc. This gentleman, with his two children, lived on Fourth street, about 200 feet from the house in which Mrs. Buck, of whom more anon, afterward died.

Dr. Harrison is positive that light cases of yellow fever have been occurring here among the negroes ever since the early part of August. He accounts for its not having been detected by the fact that the negroes here rarely call in the physicians, and that the disease is nearly always insignificant among colored people, especially this year, when its type is so mild generally, and Fernandina in such good sanitary condition. He says that two colored women have died of well-marked yellow fever in his neighborhood, one in August and the other in September. Affie Murray, the first one of these, was taken ill not later than the 12th of August, in Fernandina, where she was working, and was carried to her relations at Harrison's. The doctor visited her there, and, considering the case extremely suspicious, warned the people around her to be very careful. She got better, but never well, and finally died August 30 of the after-effects of the disease. The doctor saw her a second time before she died, and says that he *knows* that her disease was yellow fever.

Dr. Frazer thinks that the case of Mrs. Margaret A. Buck, which began on August 17, and terminated fatally August 22, was the first one of yellow fever to occur here this year. (Dr. F. has called my attention to an accidental error in his report of this case. He gave the date of Mrs. Buck's death as August 14, whereas he should have said August 22.) He ascribes her attack to infection from fomites brought home by her son Eugene from Jacksonville. The latter was a member of the Fernandina Volunteers, who passed through Jacksonville August 6, en route for the State encampment at Pensacola. He had with him two or three blankets, two or three suits of woolen clothing, a valise, and under-clothing. They remained in Jacksonville from 2.30 to 7.20 p. m. Four days later Eugene was back in his mother's

house, and six or seven days after his return Mrs. Buck was seized with yellow fever. If Mrs. Buck contracted the disease in this way she must have possessed an extraordinary susceptibility to it. Eugene Buck did not have fever until after his mother's death.

Dr. Palmer maintains that the first case of yellow fever here this year was that of Mr. Stephen A. Sessar, who was attacked September 10th, twenty-four days after Mrs. Buck, and died September 16. He says that Mr. Sessar caught the disease from a large gang of laborers who were brought into Fernandina about September 4 to take the place of the stevedores and longshoremen who were then on a strike. While these laborers might very readily have brought the disease in here, they having been gotten together hurriedly at places dangerously near Jacksonville and McClenny, both at the time infected, there is no proof that they did so. The evidence is that none of them were ill with fever until after Mr. Sessar had been taken, and that there existed numerous cases of yellow fever in Fernandina at the time the laborers were imported.

The remaining three physicians, two of them members of the board of health, did not admit the existence of any yellow fever here until September 24, when at a necropsy they found a box-wood liver, which they considered a *sine qua non* of the disease.

During the second week in August there were not a few cases of fever, more or less severe, in and around Fernandina; but nearly all the patients, together with their families, having since gone away, and those who remain being unwilling to testify, little satisfactory can be learned about them. A leading business man here informs me that it is looked upon as a disgrace in Fernandina to have yellow fever. There certainly is a remarkable repugnance here to calling anything by that name.

About the 15th of August a Chinese laundryman, named Charley Lee, who lived and washed next door to the post-office, was taken quite ill with sharp fever, severe pains, especially in the epigastrium, and other highly suspicious symptoms. He was "heap sick" for several days, and unable to work for two weeks. Dr. Harrison and I got the facts of the case from the patient, from the Rev. R. Drake, an intelligent colored shoemaker, and from Drake's wife. The shop and residence of the Drakes are separated from the Chinaman's by a very thin, open partition. The Chinaman had no doctor, and Drake, Drake's wife, and a Chinese merchant named Joe Lee, looked out for him in his illness. Charley Lee, when asked by us how he caught the fever, answered: "I no know; I wash evly body." On August 26, while this Mongolian was convalescent, Drake was attacked and had an illness very like that of the Chinaman, which lasted about the same length of time. During Drake's convalescence the postmaster was taken ill and died. The exact nature of the latter's illness and death is somewhat uncertain. It is maintained by those who do not admit that Mrs. Buck had yellow fever, that the postmaster's death was due to prolonged hard drinking; the reasoning seeming to be that, because he was intoxicated much of the time, he could not have died of anything else, whereas it seems generally conceded that habitual drunkenness predisposes to yellow fever. The suspicious features of the case are that his office was next door to Charley Lee's laundry; that he was confined to his quarters and had a nurse for two or three days preceding his death, and that a merchant, experienced in such matters, who saw his dead body, says it looked exactly like that of a man who had died of yellow fever. Shortly after the postmaster's death Drake's wife and Joe Lee were attacked, and they went through about the same ordeal as Drake and Charley Lee. Dr. Harrison assisted me in the study of the cases of the Lees and the Drakes, and he thinks, as I do, that they were yellow fever. Probably the infection was brought to the Chinaman in infected, soiled clothing, belonging to some refugee or other person recently from Jacksonville. It is not unlikely that Affie Murray, Dr. Harrison's first yellow fever patient, became infected in a similar manner. She lived with a colored woman named Belle Drummond, who was in the habit of doing part of the washing for the guests of the Egmont Hotel, the principal hotel of

Fernandina. During the stay at the Egmont, of a number of refugees and others from Jacksonville, about the time yellow fever was declared there, Affie spent most of her leisure time at the Egmont with a friend, who had charge of the soiled linen, bedding, etc. Affie's mother states that about the end of the first week in August Affie did a "three weeks' washing" for a man at the Egmont Hotel, who had just come from Jacksonville. It will be remembered that she was attacked about the 12th of August.

The first case of yellow fever to terminate fatally at Fernandina this year seems to have been that of Mrs. Buck. As all four of the regular practicing physicians here, three of whom have served through former epidemics, and two of whom were the only medical men who saw Mrs. Buck during her illness, state positively that the case was not yellow fever, it is deemed proper to give here a brief history of the case, embodying my principal reasons for differing with the physicians as to the diagnosis:

Mrs. Buck, a blonde, sixty-eight years of age, native of Brooklyn, N. Y., had been in Fernandina only a few months. Being an invalid she visited very little, but would go out for short walks daily. She, with her son and daughter, lived on Center street, corner of Fourth. They had on Center street, about 130 feet from their residence, a store (boots, shoes, and furnishing goods). The ten days preceding her attack, Mrs. Buck had assisted her daughter in the store much more than was her wont, because her son, one of the Fernandina Volunteers, was away at the encampment, and Fernandina was more than ordinarily full of people, visitors, refugees, and others from Jacksonville. It was during her son's absence that yellow fever was announced at the latter place. It has so far been impossible to arrive at any satisfactory conclusions as to the exact way in which Mrs. Buck contracted the disease.

Dr. Frazer's theory, given above, is hardly tenable. On August 17, according to those around her, Mrs. Buck had a chill during the early part of the night, followed by a burning fever, severe pains, etc. In the afternoon of the 21st she seemed a great deal better. (This apparent improvement was probably that treacherous "state of calm" so characteristic of yellow fever.) Soon afterward the patient began to sink, and died about 5 a. m., August 22. Prior to death she ejected a black fluid in small quantity, which was considered at the time black vomit. The only record extant of the case is the following report of the attending physician made to the board of health, August 18, 1888: Mrs. Buck, supposed to be typho malarial fever, seen to-day for first time. Temperature, 11 a. m, 103°; pulse rate 105. Temperature at 5.30 p. m. 104°; pulse 98. (Temperature had gone up while pulse had come down.) Both the attending and consulting physicians evidently considered the case one of yellow fever. At least half a dozen of the best people here have informed me that these physicians told them as much and more.

After Mrs. Buck's death they turned the president of the board of health out of his bed, told him what they thought, and got him to call a special meeting of the board. The following is an extract from the "proceedings of the board of health of Nassau County," under date of August 22d, 7 a. m.: "Dr. Pope, physician, announced to the board that Mrs. Buck had during the night died of fever under circumstances giving rise to grave suspicions of yellow fever, at her residence, corner of Center and Fourth streets, and that Dr. Starbuck had been called in to see the patient, and concurred in the opinion expressed with regard to the character of the disease." The board ordered an autopsy and awaited the resulting verdict, evidently expecting it to be yellow fever, and ready in that event to make it known to the world. The five practicing physicians of Fernandina were present at this autopsy, and they all, except Dr. Frazer, agreed that Mrs. Buck had not had yellow fever. The reasons they give are far from satisfactory to me. They seemed principally influenced by the facts that they did not find a box-wood liver, and did find 16 calculi in the gall-bladder. They apparently forgot that the dryish, yellow liver, although found in most, is not found in all necropsies of yellow-fever subjects, and how often after death from other well-known causes, the gall-bladder is found filled with stones that had not been suspected

during life. (Not long since at the autopsy of an officer dead of a typical case of chronic pulmonary phthisis, I found sixty gall-stones that had apparently given no trouble.) Dr. Frazer has reported his views and action concerning the autopsy. He informs me that he saw no evidences that Mrs. Buck's gall-stones had produced any inflammation or other trouble. In the Fernandina undertakers' report for August, the cause of death in Mrs. Buck's case is put down as "compaction of stones in gall duct." Here is an extract from the minutes of the board of health, 11 a. m., August 22, 1888, immediately after the post-mortem: "Dr. Horsey, health officer, reported that an autopsy had been made upon the body of Mrs. Buck, as ordered by the board, at which all the practicing physicians in the city were present, which resulted in demonstrating beyond a doubt that Mrs. Buck had not died of yellow fever."

In making this report the physicians of Fernandina lost their opportunity and assumed a fearful responsibility.

If any additional evidence be needed to prove that Mrs. Buck's case was yellow fever, it is furnished in the rapidity with which the fever spread in almost every direction from the Buck premises and in the manner of its extension. In the three weeks succeeding Mrs. Buck's decease there were five times as many deaths in Fernandina as during the three weeks preceding that event, and in the succeeding, or third period of three weeks, seven times as many as in the first period. Within two weeks after Mrs. Buck's death the fever had involved almost the whole of the block containing the residence and store of the Bucks, the Howell block, next to it, on the east side of Fourth street, and had spread up and down Center and Fourth streets.

Although this paper has grown so unconscionably long, it is necessary to follow two direct lines which the disease pursued. They are not only interesting, but one has highly important bearing upon the origin of the existing epidemic at Gainesville:

1. Jimmy McNeill, aged twelve, was employed in the Buck store. He fell ill Sunday, August 19, two days after Mrs. Buck's attack. (He finally recovered, although at one time his life was despaired of.) His younger brother, Eddie McNeill, took his place for a couple of days when he was succeeded by a larger boy named Johnnie Howell. During the illness of Jimmy McNeill, Eddie McNeill fell ill, and, after suffering only fifty-two hours, died September 12. The stepfather of the McNeill boys, John T. Graham, went down soon after and died September 21. Graham's wife, the mother of the McNeill boys, was the next victim, dying September 26. Her case was the first one of this series to be called yellow fever. Two days before her death the physicians had found a box-wood liver. The other three cases were called by different names in which the much abused term "congestion" played a prominent role. The house in which the Grahams and McNeills lived is five blocks, about a half mile, from the house of the Bucks. From the former house as a center the fever spread in every direction, very much as it had done from the latter.

2. The boy Johnny Howell, who succeeded Eddie McNeill in the Buck store, worked there three days, and on the fourth day, August 26, had a chill, followed for several days by fever. His mother, who had nursed him and Mrs. Buck, was attacked September 3, during Johnny's convalescence. She was ill in bed until Saturday, September 8, when she sat up a little for the first time. During the latter part of August and the first part of September the colored stevedores and longshoremen of Fernandina went on a strike. About September 4 a large gang of laborers from the outside were brought in to take the place of the strikers. This was about to result in a riot, with great danger to the town. To avert this the governor of Florida sent in two companies of State troops, one from Gainesville, the other from Ocala. There came also, voluntarily, armed bodies of men from Callahan, Chester, Starke, and elsewhere. On the night of September 8, Mr. J. W. Howell, the father of Johnny and husband of Mrs. Howell, having been threatened by a mob, was thought to be in danger, and the Gainesville Guards were sent to his house, where they were kept on guard all night. This Howell house is on the southeast corner of Center and Fourth streets, across

Fourth street from the Buck house, the latter being situated on the southwest corner of Center and Fourth streets.

It will be observed that the Gainesville Guards were on duty at Mr. Howell's house during the illness of Mrs. Howell, the second case of fever in that house; that there was yellow fever all around them at the time, and that the Buck premises, the very center of infection, was within a stone's-throw of them. The night in question was stormy, and the guards spent most of it on the porch. They also had full access to the interior of the house, going in and out at pleasure. They left Mr. Howell's house next morning, September 9, and went back to Gainesville September 11. About the time they reached home yellow fever broke out among them, and soon became epidemic in their town. The inference is irresistible that if the Gainesville troops were not infected before coming here, and the evidence is that they were not, they became so the night they were on guard at Howell's house.

The Ocala Rifles and the Gainesville Guards, numbering each about twenty-five men, came here at the same time, and went away on the same train. Yellow fever has not appeared among these Ocala troops nor at Ocala since.

A member of the armed squad which came from Callahan was attacked with a fever the day after he left here and reached home September 10. His name is Upchurch. Since then his younger brother and a young man named Richard have had yellow fever at Callahan.

One of the squad from Chester, named Goodbread, was attacked September 13, two or three days after he had reached his home. Dr. Hardee, of Chester, his physician, says that it was a perfectly-marked and well-nigh fatal case of yellow fever.

I have recently seen two letters from Live Oak, Florida, stating that one of the imported laborers from that place, who was here from the 4th to about the 13th of September, had been very ill with something suspiciously like yellow fever, while quarantined outside of Live Oak immediately after having left Fernandina.

There is good reason to believe that, in addition to those already enumerated, there have been at least two other foci from which yellow fever has spread here this season.

When I arrived upon the scene near the end of September, a few days after the existence of yellow fever had been officially announced, the infection had involved not only the whole of Fernandina, but also the length and breadth of Amelia Island. Pretty much all the whites who could be gotten away had gone (many of them after having had the fever), but the number of colored people not only remained undiminished, but, on the contrary, had become considerably increased. (The same, as regards the negroes, obtained at Memphis during her last visitation.) A census taken soon after my arrival showed 627 Caucasians and nearly 3,000 negroes in Fernandina and suburbs.

Taking every thing into consideration I advised that further attempts to keep the fever out of the place be discontinued, but that all our efforts should be directed toward keeping fresh fuel for the epidemic fires from coming in, and toward destroying the yellow fever contagium wherever harbored within the infected area, thereby diminishing danger for the future, especially for next summer. My advice having been taken by the authorities here and at Washington I was soon thereafter placed in charge of Government Relief Measures at Fernandina, as well as appointed executive officer of the board of health of Nassau County.

A report supplementary to this one will be made when the work then proposed shall have been completed, giving its details.

To make "confusion worse confounded," the dengue fever appeared in Fernandina shortly after the advent of the yellow fever, and prevailed for about a month. From what I have been able to gather from the physicians and from a careful house-to-house canvass of Fernandina and its environs, it appears that there have occurred on Amelia Island, within the months of August, September, and October, not far from one thousand cases of fever. Of these, somewhere near two hundred and fifty were probably den-

gue (one hundred and seventy-two of the two hundred and fifty seeming typical with eruptions, etc.) and about ten typhoid fever. How many of the remaining cases were yellow fever, and how many malarial and other fevers, it is impossible at the present writing, October 28, to determine even approximately. An attempt to do this will, however, be made at the close of the epidemic and the result incorporated in the supplementary report referred to above.

NOTES ON THE EPIDEMIC OF YELLOW FEVER AT FERNANDINA, FLA.*

On the announcement of yellow fever by Jacksonville, on the 9th of August, our board of health immediately put on an absolute quarantine, and I believe it was as near perfect as it is possible to make a land quarantine, and am certain it was effectual so far as keeping out Jacksonville people.

The sanitary condition of Fernandina was excellent, but in order not to neglect any precaution we had every lot and street in the city thoroughly cleaned and disinfected with lime, sulphur, iron, and pyroligneous acid. Of the latter the Creosote Works kindly furnished us from 20 to 25 barrels a day. Barrels of it were set up on every other corner and kept full, free to all; sprinkling carts filled with it were kept constantly moving on the streets. The city was never cleaner or more healthy. From the 1st of August to the 22d I did not see or hear of one fever patient.

On the morning of the 22d of August I was called in consultation to Mrs. Buck (of whose case I will have more to say further on). Three days after Mrs. Buck's death an ephemeral fever made its appearance and spread rapidly. It had the symptoms of dengue, but my case had no eruption. It yielded readily within twenty-four to forty-eight hours to a dose of compound cathartic pills with or without a little quinine. About the 1st of September the fever became more severe, while the symptoms were the same. Many of the cases required the second dose of compound cathartic pills before the fever would yield, but all through the epidemic I found, in every instance where I could get a free and thorough purgation of the bowels by a mercurial purgative, my patient recovered. In four cases the mercurial purgatives failed to act and all four patients died.

The fever commenced with severe frontal headache, pain in the back and legs, temperature 100° to 104° , pulse 80 to 100, a very few cases with epigastric tenderness, no nausea, no albumen in urine in the mild cases, jaundice only in the severe cases. The stools procured by mercurials were very copious, black and "grainy" after the first one or two actions, and being to all appearances identical with the "black vomit" of the first few fatal cases. On percussion the liver was found to be enlarged by congestion, but returned to its normal condition under the action of the mercurials.

I saw Mrs. Buck for the first time about three hours before she died, on the morning of August 22. She was unconscious, breathing noisy. She presented no symptom to cause a suspicion of yellow fever, except that she vomited or spit about a tablespoonful of a brown substance on the pillow. About three hours after my arrival her face became suddenly contorted, her arms were flexed with a convulsive movement and then dropped back by her sides and she was dead. As we were looking for yellow fever this brown matter ejected from her mouth, or "black vomit," was a circumstance sufficient to excite a grave suspicion of yellow fever. Six hours after death an autopsy was held; present, Drs. Hersey, Palmer, Pope, Frazer, and myself. The post-mortem revealed an intensely congested liver, fatty degeneration of kidneys, an eroded mucus membrane of the stomach, which appeared to be chronic, and an im-

* By Acting Assistant Surgeon Starbuck, Marine-Hospital Service.

paction of sixteen gall stones that would average a half-inch in diameter. Certainly these were not the pathological conditions indicating death from yellow fever.

The next death suspected to be from yellow fever was Mr. Meriweather on August 26. He had been sick with typhoid fever for six or seven weeks, and had returned to his work as brakeman on the railroad before he had recovered his strength. It was reported to the board of health that he was sick, and I was sent to see him. I found him lying on the bed suffering no discomfort. When I asked him if he was sick, he said he believed he had a little fever; that he had been having fever in the evening but was well in the morning; that his fevers only lasted an hour or two; that he had been down town that morning and was going down to the train that evening as soon as his fever passed off. He had been having these evening fevers for a week or more, and only quit work because the weather was hot and he was not strong enough to attend to his work properly, and thought he would rest for a few days; he said he had some quinine, but had not taken it. I warned him of his danger if he did not have treatment, and induced him to allow me to send his family physician to see him. In my opinion his was plainly a case of neglected malarial fever.

The next death which has been said to have been caused by yellow fever was Mr. Jack, on September 6. He had been on a debauch for many weeks and fell dead on his room floor, and when found had the neck of a whisky flask in his mouth. I saw his body a short time after his death; his face and neck were almost black with congestion, and looked to me as though he had choked to death. He had drank from the bottle nearly a half pint of whisky at that one drink. He had had no fever, as his attending physician testifies. There was certainly nothing in this case suspicious of yellow fever.

About the 11th of September some of the cases began to assume a more grave form. On that date Mr. Lesser took the fever and died on the 16th. While some of his clinical symptoms justified the diagnosis of yellow fever, upon an autopsy the pathological indications were that death was caused by malignant malarial fever.

On the 24th of September the fourth autopsy was held, and though in this case the symptom of black vomit was absent the autopsy confirmed the diagnosis of yellow fever, and within an hour I informed the Surgeon-General by telegraph. From this date to the 23d of October, when the last death from yellow fever occurred, there were but eight deaths from yellow fever, though it spread rapidly through the city and surrounding country, attacking both whites and negroes.

In, perhaps, nine-tenths of the cases that I saw there were no symptoms that indicated yellow fever, except the excessive prostration following the fever. I mean to say that the symptoms might have been caused by some other fever. I have given you above a brief history of the fever as seen by me. I will endeavor to give you my opinion as it appears to me now after reflection, and a review of the facts as presented.

I do not believe that yellow fever caused the death of Mrs. Buck; that is to say that there was not the slightest evidence found at the autopsy that she died of yellow fever, while there was unmistakable evidence that her death was from other causes; yet I admit that it is possible that she may have had a mild case of the fever that prevailed soon after her death. Taking into consideration the facts that *excessive* prostration followed the fever even in the early cases, and that there is no instance, that I know of, of the fever attacking the same person twice, I think the evidence is in favor of the diagnosis that it was yellow fever from the first, though in such a mild form that it was impossible to diagnose it at the time, though it was a pretty safe *guess* to make, as the probabilities were all in favor of our having yellow fever before the epidemic in Jacksonville was over, and was a good opportunity for the "I told you so" doctors, who are constantly getting their "hindsight" mixed with their foresight.

Why was the fever so mild, not only here but throughout the State? In my opinion it was because the fever had hibernated in the State, the virulence of the

poison being lessened by this hibernation, and it is an interesting question whether or not if the yellow-fever microbe was carefully nursed from year to year on our soil and in our climate it would not be shorn of its terror and become as harmless as Pasteur's attenuated micro-organisms of anthrax, and prove a solution of the question of how to get rid of the mortality from yellow fever.

THE YELLOW FEVER AT GAINESVILLE, FLA.*

U. S. MARINE-HOSPITAL SERVICE, DISTRICT OF THE GULF,
Gainesville, Fla., Surgeon's Office, October 26, 1888.

SIR: A very essential point to be embodied in this report, and to which I have given special attention, is the health of Gainesville for the month preceding the introduction and appearance of yellow fever within its limits. With this in view I have inspected the daily records of the practicing physicians, whose reports, marked respectively A, B, and C, I herewith inclose, and from them and from diligent investigation made in other directions, I am convinced that, until the return of the military company from Fernandina, an account of which is hereinafter detailed, there did not exist a single case of sickness of any kind to which could have been attached a suspicion of yellow or "dengue" fever.

The sanitary condition of the city was excellent and the general health exceptionally good. The county board of health, which I find to be composed of men of more than ordinary ability, established a strict quarantine against Tampa, Plant City, Manatee, Palmetto, and Jacksonville on August 9, and subsequently against McClenny and the Island of Cuba. The game of base-ball, referred to in your telegram of October 22, was played by the Gainesville and Fernandina clubs in Jacksonville July 18 and 19. I have also to report that on the 6th of August the Gainesville Guards, and the various militia companies of the State, were ordered to a State encampment at Magnolia Bluff, near Pensacola. On the 6th of August the Guards left this place and were carried to Jacksonville, where they remained about five hours before being conveyed to Magnolia Bluff. The military companies from Jacksonville also went to this encampment at the same time. The encampment was broken up on the 13th of August, and the Guards arrived in Gainesville on the 14th, after quarantine against Jacksonville had been declared by board of health of Alachua County. No sickness reported during or after the encampment.

In obedience to an order from Governor E. A. Perry, the Gainesville Guards and Ocala Rifles arrived in Fernandina and reported for duty at 5.30 a. m. September 7. The guards were immediately quartered with the Fernandina volunteers in the "armory," a building shown in the accompanying diagram attached to Captain Webster's statement, and which on account of its proximity to a "suspicious case" of sickness occurring in a house on the opposite corner, as also the sickening of one of the Fernandina volunteers, referred to in Exhibit D, merits particular attention. The Ocala Rifles were quartered in and occupied a special car which was side-tracked for their convenience. In addition to the military companies mentioned, eight men from Starke and fifteen men from Ellaville were quartered at the hotels. The subsequent movements of the Gainesville Guards, as detailed by the inclosed statement of Captain Webster marked Exhibit D, shows that the company, with the exception of an officer and two privates, was detailed for guard duty around the house of one Howells, whose wife was sick with supposed dengue fever. (Location of house shown on diagram.) The men mentioned as absent from duty were traced to an ice-cream saloon, supposed to be a house of ill repute, and also to the Florida House, near by

*By Assistant Surgeon William Martin, U. S. Navy.

the barber-shop, at which occurred the suspicious case or death of the occupant's wife. It may be well to state here that prior to the return of this company to Gainesville, and of the Ocala Rifles to Ocala, rumors of the prevalence of dengue and yellow fever were rife in both Ocala and Gainesville, and in consequence of which the board of health for Alachua County questioned the advisability of permitting the Guards to return to Gainesville without investigating said rumors and obtaining from the health authorities of Nassau County a positive and unqualified assurance of the health of Fernandina. Such assurance having been given, the company was admitted. Your attention is invited to accompanying report of Dr. R. A. Lancaster, surgeon of the Guards, marked Exhibit E. The Marion County board of health considered the evidence in their possession sufficiently conclusive to cause them to quarantine the Ocala Rifles at Blue Spring, 7 miles below their town. The evidence shows that some of the Guards were more or less ill before leaving Fernandina, but attributed it to the loss of sleep and exposure to sun, rain, and night air.

The company arrived in Gainesville the night of September 11, and the record of fever cases occurring are as follows:

Case No. 1.—Lient. Elam Evans; taken sick while in Fernandina, went to bed on arrival in Gainesville, September 11, and summoned a physician. Sunday, September 16, case was pronounced yellow fever. Died 5 p. m. September 17.

Case No. 2.—Private Ben. Miller; attacked September 13. Recovered.

Case No. 3.—Private J. E. Hodges; attacked September 13. Recovered.

The three cases cited above were attended by Dr. J. F. McKinstry, and all developed black vomit, and a large amount of albumen in urine.

Case No. 4.—Private John Ammons put to bed September 13. Vomito September 16. Recovered.

Case No. 5.—Sergt. Jos. Waugh; attacked September 14. Case light. Recovered.

Case No. 6.—Private William Wilson; attacked September 14. Case light. Recovered.

Case No. 7.—Sergt. M. F. Miller; attacked September 21. Died, vomito September 26.

The cases last enumerated were attended by Dr. N. D. Phillips, and conclude the record of sickness occurring in the military company which returned from Fernandina to Gainesville on the evening of the 11th of September.

Case No. 8.—N. R. Grnelle, civil engineer, who was a business associate of Sergt. M. F. Miller, of the Guards, and occupied together same office for several days; said office or room was also in same house occupied by yellow fever subject, John Ammons, then sick in room overhead. He was afterward engaged by health officer as an assistant in fumigation and disinfection. Was taken sick on the night of September 26, and died night of the 28th.

Citation of this first case occurring among the continuous residents shows an interval of fifteen days from the time of the direct introduction of the fever from Fernandina. Exhibit F contains a complete record of all cases to date, and shows progress of disease.

I arrived here on the morning of the 18th of October, and was cordially welcomed by the board of health and citizens, to whom I am indebted for every assistance in the prosecution of the duties to which you have assigned me.

I examined three cases which were reported to me, viz: A. J. Collins, E. A. Veyle, and J. M. Graham, whites, and found them to have yellow fever. I have also seen all the cases which have developed since. A house to house inspection has resulted in the finding by me of seven cases of yellow fever, not recognized by the patients (colored) nor their attendant colored physicians.

The board of health has been exceedingly active and prompt in its efforts to suppress and control the disease. On Sunday, September 16, when its presence was recognized, they succeeded in almost depopulating the city in one night by announce-

ing the fact to the public through the pulpits of the respective churches at evening services.

Acting upon your instructions by telegram, isolation has been as thorough and effective as it could be made. Yellow flags designate each infected house, and circumscribed areas of infection are shown by ropes stretched around them. Three guards to each house infected have been on duty continuously night and day.

A camp of detention has been established and located on a sand hill a half mile from the city limits. It comprises three houses, comfortably furnished with bedsteads and bedding for occupancy, and a dining hall, kitchen, and store room. To this place all persons who were exposed to infection have been taken and detained for ten days.

In the infected houses in the city disinfectants, consisting of copperas, bichloride of mercury, and chloride of lime have been freely and energetically used. They have also been thoroughly fumigated with sulphur. All bedding of yellow fever subjects has been burned, and all textile fabrics in rooms of such patients immersed in solution bichloride of mercury, strength one to five hundred. These houses have been closed, and will not be opened up again until such time as the board may determine, probably after frost. The work of keeping the city clean is unabated. An adequate force is kept constantly employed for this purpose, and I have never seen a place in better sanitary condition. The expense thus incurred is estimated at \$8,000. I would earnestly urge your recognition of the fact that these people have worked vigorously, promptly, and untiringly with full faith in intelligent effort bringing success, and have used all the resources at their command without stint before seeking aid from abroad, and that having exhausted their means in the endeavor to crush this national as well as local calamity, they deserve any and all assistance that may lay in your power to give them.

In this connection I would respectfully recommend the appointment of Dr. J. T. McMillan as a sanitary inspector, to continue the sanitary work on behalf of the Government, which he has so ably supervised under direction of the board of health. I telegraphed this recommendation October 26.

All business is practically suspended. Of the numerous stores only six are open, and then only for a few hours each day, the proprietors having found temporary residence in the country. The population is largely distributed outside the corporate limits wherever they could find shelter. Many are encamping, and there is necessarily much destitution among them. A census taken two weeks after the outbreak showed that out of a population of nearly five thousand people one thousand one hundred and sixty-two remained. Since then it is estimated a thousand have returned, chiefly colored. The indications are that unless some steps are taken by the authorities to prevent it the city will soon fill up by the return of the refugees. Should you see proper to advise an effective cordon I am of the opinion that the authorities would act promptly in the matter, provided you can assure them of the means necessary to pay the guard. The cost would not exceed \$3,500 per month, and destitute negroes may be employed for this purpose, thus relieving their necessities.

EXHIBIT A.

OCTOBER 25, 1888.

DEAR SIR: Have to report the following cases of fever, all seen by me since July 15 and prior to September 16, date of declaration of yellow fever here:

Miss Shannon; residence, Gil Callen; July 21; been ill ten days; diagnosis, typhoid fever; discharged August 7.

Marion Ramsey; residence, county, 12 miles from Callen; September 3; diagnosis, malarial remittent; discharged September 11.

Mr. Bradford; residence, Gil Callen; September 4; diagnosis, typhoid fever; discharged September 29.

L. J. Burton; Gil Callen; September 5; ill sixteen days; diagnosis, typhoid fever; discharged September 15.

Very respectfully,

J. F. MCKINSTRY, M. D.

DR. MARTIN.

EXHIBIT B.

OFFICE OF DR. N. D. PHILLIPS,
Gainesville, Fla., October 25, 1888.

DEAR SIR: Have to report the following cases of fevers seen by me from July 15 and prior to September 16, date of declaration of yellow fever here:

August 4. Mrs. H. Levy was taken ill on this date with remittent fever and discharged on the 7th.

Willie Taylor was taken on 15th August with bilious remittent fever; was discharged August 20.

F. Keller, jr., was taken ill on 29th of August with bilious remittent fever; discharged September 2.

Respectfully submitted.

N. D. PHILLIPS, M. D.

DR. MARTIN.

EXHIBIT C.

GAINESVILLE, FLA., October 22, 1888.

DEAR SIR: After looking over my day book I recall but three cases of fever occurring in my practice from August 1 to September 12, *i. e.*, cases in which the fever lasted over, say, twelve hours.

These cases were: Case 1, Mr. William George, who came up from his home at Archer, distant 15 miles, to stay with his brother and to be near so that I might treat him. I saw him first July 27, and found him with a temperature of 105°. He had a very obstinate attack of remittent fever, with enlarged spleen and liver. His fever was what some writers describe as typho-malarial fever. I discharged him, cured, August 24.

Case No. 2: Mr. G. Bassett, agent Florida Southern Railroad. Was called to him August 23, and found him suffering very acut pain in abdomen, accompanied with fever. This continued with more or less severity for several days. I called Dr. Phillips in consultation and we decided the trouble to be typhlitis or circumscribed peritonitis, from some cause. He was discharged cured on the 29th.

Case No. 3: Josephine Brown; mulatto girl; aged seventeen years. Was called August 2, and found a typical case of typhoid fever. She was discharged cured August 20.

These three are the only cases of fever occurring in my practice from August 1 to September 15, other than some slight fevers perhaps of a few hours' duration, from teething, surgery, bone felons, etc.

Respectfully,

R. A. LANCASTER, M. D.

DR. WILLIAM MARTIN, U. S. N.

EXHIBIT D.

HEADQUARTERS GAINESVILLE GUARDS,
COMPANY A, SECOND FLORIDA VOLUNTEERS,
Gainesville, Fla., October 20, 1888.

DEAR SIR: In reply to your inquiry respecting the presence of the Guards at Fernandina recently, I have the honor to state the Guards, twenty-five men and a surgeon, left this city on Thursday evening, September 6, 1888, at about 11 o'clock in response to an order from Governor E. A. Perry. We occupied a car by ourselves until reaching Waldo, where we were joined by the Ocala Rifles. At Starke eight men boarded the train and at Baldwin, where we waited considerable time, about fifteen men from Ellaville took the train and occupied the coach with us until we arrived at Fernandina about 5.30 a. m., September 7. The Guards were at once escorted to the armory of the Fernandina Volunteers, where we were quartered until Monday, September 10, when we took comfortable beds at the Egmont Hotel.

When we arrived at the armory we found that the wife of the barber residing on the opposite corner was very sick with brain fever and subsequently died while we were there, but can not name date. On Sunday morning, September 9, the postmaster died of congestion, having had a drunken spree. Saturday night, September 8, the Guards were called upon to guard the house of Mr. J. W. Howell, and did so guard

with twenty-two men. Mrs. Howell was at that time quite sick, just recovering from an attack of dengue fever, and was in the house around which our men were stationed. In detailing the guard they were divided into two reliefs, an hour on and an hour off. The detail when relieved from duty slept in the parlor upon the floor and in the hallway leading out of the dining-room. On this date and while we were on duty at Mr. Howell's my second lieutenant and two privates could not be found, but were found on Sunday morning, September 9, in a state of intoxication, having passed the night in an ice-cream saloon. These three men occupied rooms at the Florida House and did not sleep in the armory with the remainder of the company.

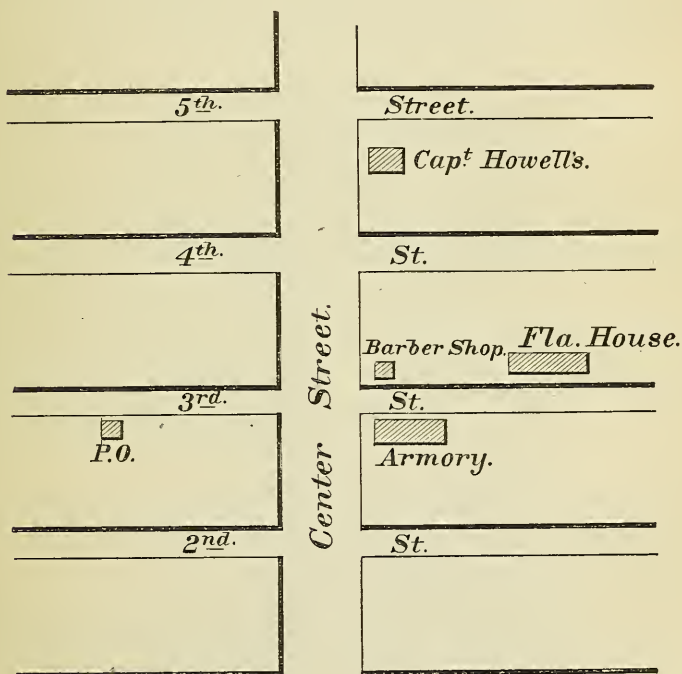
Monday morning, September 10, one of the Fernandina volunteers named Sessar, I think, was taken sick, dying about a week subsequent. On Tuesday, September 11, we left Fernandina about 4.30 p. m. for Gainesville in Florida Railway and Navigation Company's car, No. 16, arriving in this city about 10.30 p. m. on same day. Just before we left the armory Lieutenant Evans complained of severe pains in his back and head and remarked that he thought he had the dengue. Sergeant M. F. Miller was also complaining, but upon taking some medicine said the pain was much easier. Of our illness and suffering since our return you are already familiar with and needs no rehearsing from me.

Trusting this may aid you in your research for the true state of affairs,

I remain, yours, very truly,

I. E. WEBSTER,
Captain Commanding Guards.

WILLIAM MARTIN, M. D.,
Assistant Surgeon U. S. N.



Wharf.

EXHIBIT E.

GAINESVILLE, FLA., October 22, 1888.

DEAR SIR: On the ill-fated trip to Fernandina of the Gainesville Guards, I accompanied them as their surgeon. None of the company being sick, and having patients at home that needed my attention, I obtained leave of absence and returned to Gainesville on Sunday, the 9th, two days prior to the return of the guards.

Before leaving Fernandina I was shown a telegram from the president of our board of health, saying that the guards would be permitted to return to Gainesville if provided with a proper health certificate from the Nassau County (Fernandina) board of health, indorsed by myself. Seeing that our board looked to me for information, I determined to make more diligent inquiry as to the nature of the prevailing fever, which I had been assured over and over again was a *mild* type of dengue fever. I first interviewed Mr. Denham—I think that is the name—a druggist, who assured me that so far as he knew, there was no suspicion of yellow fever in Fernandina.

I then sought out Dr. Palmer, who claims to be a yellow fever expert, having gone through the Memphis epidemic as well as several others. In the privacy of his office he assured me that there was not and had not been a case of sickness in Fernandina all summer which might possibly have been yellow fever. I afterward had the same private assurances from Dr. L. Horsey, a member of the board of health. After my return to Gainesville I reported to our board of health the prevalence in Fernandina of dengue fever, telling them that I had seen none of the sick, but that from private assurances from physicians of well known integrity, I felt warranted in indorsing the certificates of the Nassau County board of health.

Of the return of the guards on the 11th, and their subsequent illness, you are already informed.

Respectfully yours,

R. A. LANCASTER, M. D.,
Surgeon Gainesville Guards.

Dr. WM. MARTIN,
Assistant Surgeon U. S. Navy.

EXHIBIT F.

Yellow fever record.—Total cases to date, twenty-two.—Seven deaths since the outbreak.

Sunday, Sept. 16.—First announcement, six cases, viz, Elam Evans, J. A. Ammons, W. N. Wilson, J. Hodges, B. Miller, and J. Waugh. No deaths.

Monday, Sept. 17.—No new cases, one death (Elam Evans).

Tuesday, Sept. 18.—No new cases, no deaths.

Wednesday, Sept. 19.—No new cases, no deaths.

Thursday, Sept. 20.—No new cases, no deaths.

Friday, Sept. 21.—New cases, one (M. Fitch Miller); deaths, none.

Saturday, Sept. 22.—New cases, none; deaths, none.

Sunday, Sept. 23.—New cases, none; deaths, none.

Monday, Sept. 24.—New cases, none; deaths, none.

Tuesday, Sept. 25.—New cases, none; deaths, none.

Wednesday, Sept. 26.—New cases, none; deaths, one (M. Fitch Miller).

Thursday, Sept. 27.—New cases, one (N. R. Gruelle); deaths, none.

Friday, Sept. 28.—New cases, none; deaths, none.

Saturday, Sept. 29.—New cases, two (Miss Hall and Luther Hall); deaths, one (N. R. Gruelle.)

Sunday, Sept. 30.—New cases, none; deaths, none.

Monday, Oct. 1.—New cases, none; deaths, none.

Tuesday, Oct. 2.—New cases, one (John Miles, colored); deaths, none.

Wednesday, Oct. 3.—New cases, none; deaths, none.

Thursday, Oct. 4.—New cases, none; deaths, none.

Friday, Oct. 5.—New cases, none; deaths, one (Luther Hall).

Saturday, Oct. 6.—New cases, none; deaths, none.

Sunday, Oct. 7.—New cases, one (Adolphus Vidal, son of Dr. Vidal); no deaths.

Monday, Oct. 8.—New cases, none; deaths, none.

Tuesday, Oct. 9.—New cases, none; deaths, one (John Miles).

Wednesday, Oct. 10.—New cases, none; deaths, none.

Thursday, Oct. 11.—New cases, none; deaths, none.

Friday, Oct. 12.—New cases, none; deaths, none.

Saturday, Oct. 13.—New cases, two (W. R. Davis and A. J. Collins); deaths, none.

Sunday, Oct. 14.—New cases, none; deaths, one (W. R. Davis).

Monday, Oct. 15.—New cases, two (E. E. Voyle and James H. Graham); deaths, none.

Tuesday, Oct. 16.—New cases, none; deaths, none.

Wednesday, Oct. 17.—New cases, none; deaths, none.

Thursday, Oct. 18.—New cases, none; deaths, none.

Friday, Oct. 19.—New cases, one (Linus Gamble, colored); deaths, none.

Saturday, Oct. 20.—New cases, none; deaths, none.

Sunday, Oct. 21.—New cases, three (D. D. Tilghman, and a colored man and woman); deaths, none.

Monday, Oct. 22.—New cases, none; deaths, none.

Tuesday, Oct. 23.—New cases, one (Dr. N. D. Phillips); deaths, none.

Wednesday, Oct. 24.—New cases, none; deaths, none.

Thursday, Oct. 25.—New cases, none; deaths, one (D. D. Tilghman).

Friday, Oct. 26.—New cases, one (Will Jones, colored); deaths, none.

Total number of cases to date, twenty-two; total number of deaths to date, seven.

GAINESVILLE, FLA., November 9, 1888.

SIR: I have the honor to report a most unsatisfactory condition of affairs in this place at this time. As stated in a previous communication, the population who have remained in the town is largely negro. Many of them have been subjects of the fever, and having no conception of the grave character of the disease, and being bitterly opposed to any of the restrictions necessary to isolate and disinfect, conceal their illness in every manner their ingenuity can devise, and throw every obstacle at their command in the way of our obtaining charge of such patients. When discovered by me they declare they have no yellow fever and do not want any white physician to attend them. There are two colored practitioners here who have had cases of yellow fever repeatedly, which they failed to recognize, and in my opinion were incompetent to diagnose. One of them is undoubtedly responsible, in a great measure, for the hostility manifested by their clients to our relief measures. The evidence that the fever is widespread and increasing among this class is abundant, and it may be reasonably deduced that with a mild winter we are to have here a repetition of the experience of Plant City. As soon as the whites return to their homes and these infected negroes are employed by them as servants in their respective households it is highly probable that there will be an occasional outcropping of the malady all through the season, to be increased when spring and summer sets in; hence it would appear that your surveillance and control must extend through the winter.

You have doubtless perceived that the depopulation by the white residents of the town had left the white resident physicians without a constituency, and that they could have no reason for remaining exposed to this infection except as a matter of humanity. They have very kindly extended to me all the assistance they could give under the circumstances, and your recent order to employ them, if practicable, is all that could be desired.

I shall have to request that you send me a man familiar with the work of fumigation and disinfection. It is very difficult to obtain one here as the compensation is not commensurate with the risk incurred or the character of the labor to be performed. A stranger would be preferable because the injury of property in some instances, and the destruction of it in others, necessarily occurring in the thorough and effective prosecution of this work, involves much trouble. The negroes are especially difficult to deal with, their ignorance and prejudice preventing a ready compliance with our requirements in the disinfection of their homes, and their scarcity of clothing preventing our control of infection on their persons.

Very respectfully, etc.,

WM. MARTIN,

Assistant Surgeon U. S. Navy.

Surgeon-General J. B. HAMILTON,

U. S. Marine-Hospital Service, Washington, D. C.

SURGEON ROSS TO ASSISTANT SURGEON WM. MARTIN, U. S. NAVY.

U. S. MARINE-HOSPITAL SERVICE,
OFFICE OF SURGEON IN CHARGE GOVERNMENT RELIEF MEASURES, FLORIDA,
Fernandina, Fla., November 30, 1888.

MY DEAR DOCTOR: Many thanks for your letter and your trouble.

I felt satisfied that if the Gainesville Guards had not become infected before, they must have become so the night they occupied Mr. Howell's house.

I thought, however, that possibly they had gotten the germs of the disease among them about the time they were in Jacksonville playing base ball, etc., about August 1.

The superintendent of the Florida Railway and Navigation Company has informed me that after yellow fever appeared in Jacksonville he requested all his agents to make a noonday health report to him, and that for two weeks before the Gainesville Guards came here his agent at Gainesville, who was also at the time president of the Gainesville board of health, would not send any reports. The superintendent also thought that Professor Proctor was in Gainesville a little before he went to New York, where he died very soon after arrival. Was Proctor in Gainesville at all?

The other day four well-filled official envelopes came here directed Assistant Surgeon William Martin, U. S. Navy, Fernandina, Fla. Thinking it a clerical mistake, I forwarded them to Gainesville in fresh envelopes.

Since they were sent it has occurred to me that possibly the contents were some vouchers, blanks, etc. for which I have been waiting a long time, and that your name was on them by mistake; that they might have been for me. If so, I would thank you to return them as promptly as possible, as they are being anxiously waited for by myself and others. Yellow fever has let up here, and all restrictions have been removed. Shall complete disinfection, etc., next week; am impatient to get away. Do you know any one who would like to relieve me?

Yours, most truly,

J. W. Ross.

GAINESVILLE, FLA., *December 5, 1888.*

SIR: I have the honor to report that in obedience to your instructions of November 2 I took charge of Government relief measures at this place on that date and found the existing condition of things to be as follows:

The president of the board of health had left on September 17, at the first rumor of the existence of fever, leaving the board very much disorganized. The remaining members did what they could, with the aid of the sheriff, to guard infected houses and in the way of sanitation, but without a head or defined plan or system of work the good accomplished in one quarter was counterbalanced to a great extent in some other. The guards were notoriously inefficient, allowing residents to pass them at will on presenting a plausible excuse, and in one instance allowing soiled and infected clothing to be passed out and carried across the city to be washed.

With the president of the board of health went the mayor, marshal, and several members of the city council, leaving the city in a state of chaos as to executive officers. The clerk of court and sheriff represented the county faithfully for a while, but both were candidates for re-election, November 6, and as soon as the result of the election was declared they too deserted.

No rule had been made requiring physicians to report cases in their care, and while the white physicians voluntarily made such reports the negro doctors did not, avowing that the disease was not yellow fever, thereby fostering a feeling of distrust among the negroes and making it very difficult to learn of the existence of a case among them, with the result that the negro quarters are now thoroughly infected and must undergo heroic treatment in the way of disinfection.

The principal factor in producing and continuing this state of feeling among the colored population has been one of their number calling himself a doctor, Parker by name; his ignorance is only equalled by his pomposity, in instance of which I have only to quote his reply to a question of mine in regard to one of his patients whom I had found to have yellow fever. Asking him his opinion of the case, he answered with a flourish such as only his kind is capable of producing: "Sah! Speaking conscientiously and autopsically, I pronounce it malarial fever." He is entirely incompetent to properly diagnose a case, and refuses to recognize even the most well-defined cases of yellow fever; he also persistently impresses upon the minds of his patients that the white physicians, if allowed to attend them, will poison or experiment fatally upon them. So thoroughly has he imbued the negro population with this idea that in every possible instance the illness of patients has been concealed by themselves and their friends, and in many of the milder cases they have not even kept in the house, but have gone about promiscuously, thus spreading contagion and thoroughly infecting every locality.

I have made complaint of this man Parker, in which the other physicians have joined, and have endeavored to have him prosecuted, but the mayor of the city has in every instance dismissed the case and refuses to enforce the law he is sworn to execute.

On the 14th of November I became fully satisfied that the city was infected beyond all hope of redemption, principally through this persistence in the belief of the negroes that there was no yellow fever here, and their consequent reckless movements

about the city. Finding that all efforts to check the course of the disease must, under existing circumstances, prove futile, I discharged all the guards and cut off this useless expense.

On the morning of November 26 there was a heavy frost, and the refugees, many of whom, made it an excuse to return to the city against my protest, while the executive authorities, through criminal negligence, took no measures to prevent it.

The mayor of the city, who had left immediately upon the announcement of the fever, did not return until all arrangements for the welfare of the city had been systematized and the work was well in hand, with a relief fund to draw upon. Since resuming his position he has persistently set at naught and rendered inefficient all efforts of the board of health, in conjunction with myself, to prevent the return of refugees until the cold weather had become sufficiently established to render it entirely safe and the fever killed beyond the possibility of a return. He has upon all occasions, publicly and privately, cast discredit upon every movement organized by me for the general good of the town, and has in every way tried to establish a feeling of dissatisfaction among the citizens as regards myself, even finding fault with the employment by me of the resident physician, for no other reason that I know of than to gratify a petty malice, because I did not recognize him as a paramount authority and go to him for instructions. Contrary to the explicitly stated conviction of the board of health, he has invited refugees to return, declaring there is no yellow fever in Gainesville, and even going so far as to express his doubt as to whether there has ever been any. Being proprietor of one of the largest hotels here, which he has wired the manager to return at once and open, he is naturally anxious that quarantine should be raised and travel resumed; but to fill the city with fresh material until the fever has been positively eradicated is, in my opinion, a most unwise proceeding.

This action of the mayor, in connection with the reckless exposure of the colored population, will make it necessary, and I hereby recommend, that the Government keep a surveillance over the city through the entire winter, as a mild season may keep the germs of the disease alive, and the return of summer may witness a repetition of Plant City.

My experience with the authorities in Florida, investigating yellow fever, has not been altogether pleasant, as all places dread to have this scourge credited to them and seem to think that by denying its existence they can avoid its ravages. For example: When I visited Green Cove Springs in obedience to your orders, and declared its presence, the citizens, instigated by the local paper, were about to lynch the doctor who had first pronounced upon it, and were kind enough to suggest that I be included in this neck-tie sociable. She now has yellow fever to her full satisfaction and thorough belief. I was also unfortunate in reaching Gainesville just on the eve of a local election, and was approached by both parties, who wished to use me to further political interests.

Notwithstanding the course pursued by the chief magistrate of the city, and the minor annoyances caused by colored doctors, I believe and am assured that my labors have been appreciated by the majority of the citizens and met with the approval of the most influential and intelligent portion of the community.

With all the obstacles in the way, we have labored assiduously to stamp out the disease, treating one hundred and forty-seven cases, one hundred and thirty-one of which have been discharged cured, only sixteen deaths occurring. The last cases reported were taken November 28.

November 30. Dr. J. L. Posey reported for duty as sanitary inspector; on December 1 all Government relief was suspended; on December 3 the work of fumigation was commenced and completed on the 6th.

Very respectfully, etc.,

WM. MARTIN,
Assistant Surgeon, U. S. Navy.

Surgeon-General J. B. HAMILTON,
*U. S. Marine-Hospital Service,
Washington, D. C.*

Copy.]

OFFICE BOARD OF HEALTH,
Alachua County, Fla., December 7, 1888.

Resolved, That we gratefully acknowledge the very efficient and timely assistance rendered this board and the people of Gainesville by Surgeon-General Hamilton, U. S. Marine-Hospital Service, through his representative, Dr. Wm. Martin, Passed Assistant Surgeon, U. S. Navy, and we would specially call the attention of the Department at Washington to the marked ability of Dr. Martin in his management of yellow fever, evidenced by the success which has attended his efforts in our behalf.

Resolved, That copies of these resolutions be forwarded to Drs. Hamilton and Martin.

N. D. PHILLIPS,
Acting President Board of Health.

ALPHABETICAL LIST OF CASES OF YELLOW FEVER AT GAINESVILLE, FLORIDA.

No.	Color.	Name.	Date of death.	No.	Color.	Name.	Date of death.
1	W.	Ammons, J. A.		60	W.	Graham, Ida	Nov. 11.
2	C.	Anderson, Rosa		61	C.	Graham, Elijah	
3	C.	Anderson, Mello		62	W.	Gruelle, N. R.	Sept. 29.
4	W.	Arnold, Willie		63	C.	Gullette, Anna	
5	C.	Alderman, Phyllis		64	W.	Hall, Margaretta	
6	W.	Bennett, R. H.	Nov. 18.	65	W.	Hall, L. E.	Oct. 5.
7	C.	Bennett, James		66	C.	Hall, Sarah	
8	C.	Blair, Amelia		67	C.	Hall, Wesley	
9	C.	Brigham, Ellen		68	C.	Harris, Si	
10	C.	Brigham, John		69	C.	Haynes, Fanny	
11	C.	Brigham, Vienna		70	C.	Haywood, Dan	
12	C.	Cato, Jno.		71	W.	Hill, Willie	
13	C.	Cato, M. S.		72	W.	Hodges, J.	
14	C.	Caldwell, Spencer		73	C.	Howard, Rebecca	
15	W.	Caperotas, Jno. A.		74	C.	Hunter, Dan	
16	C.	Chisholm, Oscar		75	C.	Jackson, Peter	
17	C.	Chisholm Josephino		76	C.	Jackson, Violet	
18	C.	Chisholm, Sam		77	C.	Jenkins, Thos.	
19	C.	Cleary, J.		78	C.	Johnson, Martha	
20	C.	Cleary, Mrs. Rachael		79	C.	Jones, Fanny	
21	W.	Collins, A. J.		80	C.	Jones, Peter	
22	W.	Corr, P. W.		81	C.	Jones, Wm.	
23	C.	Cook, Sam		82	C.	Kyle, Mrs.	
24	W.	Coleman, Ida		83	C.	Lee, Janie	
25	C.	Crawford, Jacob		84	C.	Lloyd, Mrs. Emma	
26	W.	Culmick, Jno. A.		85	C.	Lumpkins, Henry	Nov. 6.
27	C.	Daniels, Wm.	Dec. 2.	86	C.	Metts, Ruth	
28	C.	Daniels, James		87	W.	Miller, B.	
29	C.	Daniels, Alex.		88	W.	Miller, M. F.	Sept. 26.
30	C.	} Daniels, Mrs. and two children		89	C.	Miles, Jno.	Oct. 9.
31	C.			90	W.	Milliner, Mrs.	
32	C.			91	C.	Morton, Jno.	
33	C.	Davis, Spencer		92	W.	Morris, J. A.	
34	W.	Davis, W. R.	Oct. 14.	93	W.	Morris, J.	
35	W.	Davis, J. H.	Nov. 13.	94	W.	Morris, Susan	
36	C.	Durden, Mrs.		95	W.	McPherson, T. B.	
37	W.	Evans, Elam	Sept. 17.	96	C.	Nelson, Wm.	
38	W.	Ernie, Achille	Nov. 6.	97	W.	Phillips, Dr. N. D.	
39	W.	Ernie, Mrs. A.		98	W.	Pinkossan, H.	
40	C.	Fearnster, Jno.		99	W.	Pinkossan, Chas.	
41	C.	Feltner, Fanny		100	W.	Pinkossan, Herbert	
42	C.	Fleming, Eliza		101	W.	Pinkossan, Bessie	Nov. 23.
43	C.	Fleming, Henry		102	W.	Pinkossan, Sallie	
44	C.	Frazier, Mary		103	C.	Rainey, Julia	
45	C.	Frazier, Sarah		104	W.	Ramsey, Mrs.	
46	W.	French, Wm.		105	C.	Reeves, Jno.	
47	W.	Frost, Thos.		106	W.	Rickets, Sid.	
48	C.	Gaines, Frank		107	W.	Sadler, Mrs.	
49	C.	Gaines, Isiah		108	C.	Sawp, Warren	
50	C.	Gaines, Susie		109	C.	Sebastian, J. C.	
51	C.	Gamble, Limus		110	C.	Smith, Fanny	
52	C.	Gee, Chas.		111	W.	Stevens, Thos.	
53	C.	Glass, Geo.		112	C.	Stewart, Maria	
54	C.	Glass, Wm.		113	C.	Stewart, Jno.	
55	C.	Gordan, Jno.		114	C.	Stewart, Milton	
56	C.	Green, Peter		115	W.	Stewart, R. M.	
57	W.	Graham, J. H.		116	W.	Stewart, Chas.	
58	W.	Graham, Jno. M.	Nov. 2.	117	C.	Stewart, Dudley	
59	W.	Graham, Mrs.	Nov. 9.	118	C.	Stewart, Maria	

ALPHABETICAL LIST OF CASES OF YELLOW FEVER AT GAINESVILLE, FLORIDA—Cont'd.

No.	Color.	Name.	Date of death.	No.	Color.	Name.	Date of death.
119	C.	Stewart, Stephen J	Oct. 25.	134	C.	Ware, Lavina	
120	C.	Stewart, Julia		135	C.	Walker, Elijah	
121	W.	Tilghman, D. D.		136	C.	Wells, Bella	
122	W.	Tinsley, A. J.		137	W.	Whiddington, J. L	
123	C.	Tipple, Mrs.		138	C.	Whittaker, Amelia	
124	C.	Thompson, Abbe		139	C.	Whitfield, Caroline	
125	C.	Vance, Fanny, ...		140	W.	Wilson, W. N.	
126	C.	Vance, Wm.		141	C.	Williams, Winnie	
127	W.	Vidal, A.		142	C.	Williams, Jack	
128	W.	Voyle, E. E.		143	C.	Williams, Eliza	
129	W.	Voyle, E. W.		144	W.	Wood, N. P.	
130	W.	Waugh, J.		145	W.	Wood, Anna	
131	C.	Walker, Alf.		146	C.	Wood, Geo.	
132	C.	Walters, Elliot		147	C.	Woodward, C.	
133	C.	Ware, Hattie					

RECAPITULATION.

	White.	Black.	Total.
Cases	53	94	147
Deaths	13	3	16
Recovered	40	91	131

First report September 16, six cases, all white, and belonging to Gainesville Gnards. just from Fernandina.

First death, Elam Evans, white, September 17.

Last case reported November 28, three colored.

Last death, Wm. Daniels, colored, December 2.

Percentage of deaths among whites 245+

Percentage of deaths among blacks 03 +

Total percentage of deaths, nearly 11

COUNCIL CHAMBER,
Gainesville, Fla., December 5, 1888.

Whereas the terrible scourge, yellow fever, which has prevailed in our city since September 16, 1888, laying waste many happy homes and carrying destruction in its path, has so far disappeared as to render it hopeful that the poisonous fangs have become harmless, and a sense of security has settled upon us, it is fitting that we, as a council in meeting assembled, should render tribute to those who have so nobly stood by us in our hour of peril.

Under ordinary circumstances, when our local physicians have done so nobly, it would be difficult to eulogize any one in particular, but upon this occasion there is one in our midst to whom more than a passing mention is due from this body.

When the disease became epidemic, and affliction, like a specter, hovered over our homes, Dr. William Martin, assistant surgeon. U. S. Navy, came nobly to our rescue, leaving the quietude of his post at San Francisco. beyond the possible reach of the dreaded pestilence, and gallantly volunteered to cast his lot among those of us who were unable to flee from the monster, tendering his time and professional services to this city without fear or reward; and well he acquitted himself, being at all hours of the day and night at his post of duty.

To his professional skill, devotion, and zeal is due the lives of many of our citizens to-day: Therefore, be it

Resolved, That a vote of thanks be tendered him by this city for the timely offer of his professional services, for his zeal and energy during the epidemic, assuring him that his life among us during our hour of sore trial has endeared him to all who have enjoyed his acquaintance and companionship, and that his services are so deeply engraven upon our memories that time can not obliterate them.

Resolved, That an official copy of these proceedings be tendered him, and that the same be published in our city papers and spread upon our minute-book.

YELLOW FEVER AT MACCLENNY, FLA.*

GENERAL: In compliance with your request, I herewith submit the following report on the epidemic of yellow fever which prevailed during the months of August, September, and October, 1888, in the town of Macclenny, Fla., including an account of the measures taken by the Government and the local authorities to prevent the introduction of the disease, to limit its spread, and to prevent its possible recurrence.

It would be difficult for the statistician to present a fair approximate of the fearful ravages (the loss of life, the commercial and financial depression) which have resulted from the epidemics of this insidious disease.

From the year 1702, when New York suffered its first severe visitation, and Biloxi, Miss., the first appearance of yellow fever on the Mississippi Sound, there are few cities of the Mexican Gulf coast and Atlantic seaboard, and even many interior cities and towns, but what have been visited during the past century by epidemics more or less severe. Fresh in the memory of many minds are the terrible scenes of the epidemic of 1878, when the "Yellow-hued foe of the tropics" invaded the Crescent City, and, following the shore-line of the Mississippi, carried death and desolation throughout the Mississippi Valley.

* * * * *

The voluminous literature of this subject, upon examination, I think, discloses the fact that the weight of evidence is entirely against the theory of local origin, and the experiences of the past decade demonstrate beyond cavil the immense value of maritime sanitation as the only rational basis for maritime quarantine. Upon what hypothesis can the advocates of the "local-origin theory" explain the immunity of the city of New Orleans from this disease since the epidemic of 1878? It has been held by many able observers that the "materies morbi" of yellow fever had become endemic in that city in view of the frequent recurrence after its original importation, and that with certain well-recognized atmospheric conditions the disease would exhibit itself periodically in localized epidemics.

During the past ten years these fostering conditions of soil and atmosphere have been more or less present during the summer months, conjoined with a notoriously deplorable state of municipal sanitation, and yet there has not been during the ten years a sporadic case reported to the city health authorities. The absence of the always imported germ, the detention of persons and the purification of vessels, the disinfection of fomites of crew and passengers from infected ports is the only rational explanation of the remarkable exemption which the great metropolis of Louisiana has enjoyed during this period from a disease which had by its oft-repeated ravages (from 1769 to 1878) well-nigh destroyed her commercial progress and industrial developments. If the adoption of the modern methods of maritime sanitation and quarantine have not demonstrated that this "alien infection" has been and can be forever excluded from our shores, then it would appear that there is nothing but illusion in the logic of cause and effect.

The city of Jacksonville is the commercial metropolis of Florida, and her relation during the epidemic of 1888 to the towns and hamlets of the State was identical with that of New Orleans during the year of 1878. By virtue of her connection by rail and river with all parts of the State she became the focal point for the distribution of the infectious principle of this pestilential disease. Many days before the declaration that yellow fever was epidemic in Jacksonville was made, numbers of residents and visitors had taken flight, filled with a vague alarm from the numerous deaths that had already taken place and the increasing number of those stricken with a suspicious

* By J. L. Posey, M. D., sanitary inspector.

type of fever, so that the germs of this subtle disease had already been introduced into many adjoining towns; and such was the case at Macclenny, Fla.

MACCLENNY, FLA.

In the early period of the epidemic in Florida a system of sanitary inspection of its towns and cities was inaugurated by the Surgeon-General of the Marine-Hospital Service, with a view of ascertaining the existence of yellow fever in the southern section of the State, particularly in order to remove all unnecessary quarantine restriction upon trade and commerce upon towns known to be healthy.

Upon my arrival, on the evening of the 9th of September, at this point, immediate inspection established the fact that an epidemic of yellow fever was prevailing, and that the disease had been gradually progressing since the 8th of August. Previous to the official announcement on the 9th of August of the epidemic in Jacksonville, two journeymen printers, Stokes and Corbett, left this city for Macclenny about the 1st of August, to work in the office of the Florida Sentinel, a local paper edited by the Rev. J. W. Folsom. Stokes and Corbett both developed well-marked cases of yellow fever within ten days after their arrival. Both of these men lodged at the Mayflower House, at the corner of Ocean and Forsythe streets, in Jacksonville, where a number of cases of fever had occurred, the building being subsequently destroyed by fire by order of the city health authorities as a precautionary sanitary measure. Corbett died at his father's home from black vomit on the 9th of August, within the corporate limits of the town, and Stokes, who was sick in the Sentinel office during part of his illness, resided with the Folsom family, and recovered in about fifteen days. Many of the visitors to the Corbett house during his son's illness and those who attended the funeral were subsequently taken sick with the same fever in from seven to ten days. In the Folsom family all were attacked after the convalescence of Stokes, and on the 25th of August Mrs. Folsom died of black vomit, suppression of urine, and uræmic coma, on the 6th or 8th day of her illness. From the Sentinel office and the dwelling of Rev. J. W. Folsom the disease gradually but slowly invaded the adjoining houses until, on the 9th and 10th of September, nearly every house in the village became infected. I visited about forty cases at the date of my inspection, and there had been five deaths up to that date. The true nature of these cases was not suspected by the local physicians, as they were diagnosed as "malignant bilious fever" and "remittent fever." From the number of typical cases at the date of my visit, and the deaths that had occurred where all the striking signs and physical appearances were present in formidable array, it was difficult to conceive that there could exist any doubts in the minds of medical men as to the true character of the disease. The case of J. W. Macclenny, whom I saw in the throes of dissolution on the evening of the 9th September, presented a repulsively striking picture of the hemorrhagic form of this fever. The face was of a dusky bronze color, the brow and low portions of neck were deep lemon hue, the muscles of the face and mouth quivering with convulsive twitchings, the eyes rotated inward and were deeply injected, the sclerotic stained with the familiar icteroid color, the lips dry and fissured, teeth thickly coated with bloody sordes, the gums and nasal apertures showing recent signs of hemorrhage. The pillows and bed-linen were spattered with the dark coffee-ground vomit, and the atmosphere of the small and tightly-closed room was saturated with the peculiarly-sickening emanations from the subjects of this disease.

The site of this town is a flat, sandy plateau, with insufficient fall for effective drainage, and contiguous to it are extensive areas of alluvial basins and marshes. The large heaps of decaying sawdust adjoining a lagoon in the center of the town; the wretched sanitary condition of its streets, public and private premises; the continuous intense heat and occasional humidity combined to produce a miasmatic atmosphere, which became a congenial nidus for the propagation of the infectious matter already introduced. From the accompanying statement of the number of cases, a record of which was kept and furnished me by Dr. Geo. E. Shuey, but which is

incomplete, it is seen that the area of infection was small during the month of August, there being only nineteen cases among the whites, and yet five deaths; that the month of September shows a larger area and more intense infection, there being one hundred and forty-nine cases among the whites, and sixteen deaths; in October, twenty-nine whites, and one death; November, nineteen cases, and one death, making a total of two hundred and eight cases of whites, and twenty-two deaths; to this is to be added one hundred and thirty cases of negroes, and one death; total, white and colored, three hundred and thirty-eight, and twenty-three deaths. The disease ceased after the first frost, having covered a period of four months, and of those who remained during its prevalence a very small percentage escaped contracting it.

After completing the work of disinfection and fumigation at Gainesville, Fla., I proceeded in accordance with your orders to Macclenny, Fla. From the 18th of December until the 31st of January, 1889, all of the infected houses in this town were, under my supervision, subjected to a thorough disinfection and fumigation. Solutions of mercuric-chloride, 1 to 500, were used on the floors, walls, and wood-work of rooms which had previously been filled with the fumes of sulphur for six or eight hours; all infected bedding was burned and feather goods subjected to superheated steam; tickings boiled in a solution of mercuric-chloride, 1 to 1,000. It is possible that some infected material may have been concealed, but the liberal manner in which the owners were treated, and the good quality of the articles furnished by the Government to replace those destroyed, obviated any extensive concealment; besides this, an ordinance was passed by the municipal board empowering the inspector to enter dwellings and condemn all infected articles, fixing a severe penalty for the concealment of articles of bedding, etc., used by the sick. This plan of wholesale domestic disinfection and fumigation has, I believe, never before been practiced in any of the Southern towns and cities after the subsidence of former epidemics; and there is no reason why, if properly practiced, it should not prove eminently useful as a prophylactic measure against the recurrence of sporadic cases and localized outbreaks during the summer following an epidemic of yellow fever.

Table of cases of yellow fever in Macclenny, Fla., and vicinity, 1888.

[Whites only.]

Month.	Cases.	Deaths.
August	19	4
September	141	16
October	29	1
November	19	1
Total	208	22
Colored cases, about		130
Colored deaths		1
Total number cases		338
Total deaths		23

The large proportion of fatal cases in the first six weeks was largely due to the fact that the disease first attacked those that were feeble, aged, or already diseased, and some of the deaths can not fairly be attributed to yellow fever.

That the germs of this disease have a wonderful degree of vitality, and may survive the mild winter in subtropical latitudes, and even in temperate regions, has been frequently shown. The following illustration, quoted from Pepper's System of Medicine, is a curious and well-authenticated instance, showing how the infection may be conveyed in a most innocent and unsuspecting manner. The facts were given to Prof. S. M. Bemiss by Dr. Shannon, of Ocean Springs, Miss. :

On the 18th October, 1883, Major J. B. B. died of yellow fever in Ocean Springs, Miss. I moved the family at once to the healthy locality where you saw Miss B., not

allowing them to take any article from the room where the husband and father had died. The children asked for a lock of their father's hair, which I refused, but the oldest daughter, now dead, prevailed upon the nurse to give it her. She placed it in an old envelope that had been torn open at the end, and carefully folded it, the torn end down, thus practically sealing it, and laid it away among other old letters. On Sunday, November 4, at 12.30 p. m., she brought this envelope out upon the open piazza and opened it for the first time to examine the lock of hair and show it to her aunt, Miss S., who was visiting her, and, upon inhaling the concentrated poison confined in the envelope and emanating from the hair, exclaimed, "Oh, what a peculiar smell." She then handed the envelope to her aunt, Miss S., who, unconscious of danger, also inhaled the messenger of death, with a similar exclamation, when Mrs. B., who was standing near, reached out her hand for the envelope, but was prevented from getting it by the entreaties of a fretful child to be taken up in her arms. This gave time for sufficient reflection, and she admonished the young ladies of the possible danger. The envelope was then carefully folded, and with its fatal contents was placed in the drawer where it had been since the 14th of October. This drawer had been almost daily opened. On the following Saturday night, November 10, at 9 p. m., Miss S. was taken sick with a chill, and Miss B. at about 2 a. m., some five hours later, the period of incubation being less than seven days in both cases. No other person handled the fatal envelope, or in any other way came in contact with it, and there is, after the most careful inquiry, no suspicion of any other source of infection in these two cases. Miss S. died on November 14; Miss B., November 16.

This strangely illustrates the subtle and tenacious character of the specific poison of yellow fever and the necessity for the destruction or disinfection of all fomites which are so far known to retain the infection of this malady.

The protection of the State of Florida from future invasions of this disease is one which involves the safety and health of the entire Gulf coast and Southern Atlantic sea-board; and owing to her peculiar geographical position, her close commercial relations with Havana, Cuba, and extensive coast-line indented with bays and inlets, which invites illicit traffic from her tropical neighbors, and through which the disease is usually introduced, it clearly devolves upon the National Government to establish such a rigid sanitary vigilance, by means of coast-patrol cutters, that the pest-bearing "viveros," laden with "aguardiente and cigars," will find it a costly and dangerous occupation to enter Florida waters. It is utterly beyond the ability and resources of the State of Florida to always protect itself from this constant source of danger—the importation of this "exotic infection"—and is a duty that certainly should be assumed by a Government whose paternal solicitude for its people ought to be shown by the adoption of such wise and liberal measures as will insure their cities against future ravages of this tropic pestilence that has so often brought terror, death, and desolation to the towns, cities, and hamlets of the Atlantic and Gulf coast.

Respectfully,

J. L. POSEY, M. D.,

United States Sanitary Inspector, Marine-Hospital Service.

Surgeon-General JOHN B. HAMILTON.

OBSERVATIONS ON CHAGRES FEVER.*

Every distinct habitat of malaria impresses itself upon the constitution in a peculiar manner.

During the past few years a difference in the grades of malarial fever from different localities has been recognized; the thoughtful practitioner is thereby given a wide field of observation, resulting at times in the advancement of an indisputable opinion and convincing proofs that, if submitted to the profession, would establish beyond a doubt that types of malarial fevers are abundant, distinct in symptoms, in results, and not yielding to uniform "specific" treatment.

The sweeping definition and symptomatology of malarial fevers decidedly fails to embrace malarial fevers as presented in various localities.

The "bilious fever" of Alabama swamps, the "swamp fever" of the Texan-Mexican frontier are as different, in my opinion, as the "rice fever" of Louisiana in comparison with the Chagres or Panama fever.

It is not my intent or purpose, however, to advance any theories, or with analysis draw a differential diagnosis, but concisely treat of "Chagres fever" as witnessed in various stages at the Gulf quarantine. A variety of types of malarial fevers were contributed by the Mexican coast, while Aspinwall furnished the cases now to be considered. The history of any individual case of the Chagres fever patients was typical of all.

It must be borne in mind that the patients were seen after exposure to the miasma, the expiration of some days, while en route to Ship Island by sea, which at first sight should have been a decided benefit.

At Colon they had been exposed to malarial influences. There was no escape.

No known medication or quininization, no precautions were of avail, nor could they avert the attack of the insidious element.

The attack was ushered in with a loss of appetite, a feeling of languor, inability to perform the least duties aboard ship, intense headaches, pains in limbs (muscular), intense lumbar pains, chilliness, and as a rule occurring between noon and sunset. After a lapse of a few days apyrexia ensued, marked by high temperature, delirium and continuing from six to twenty hours.

The apyrexia, more or less marked, following, at times barely recognizable, limited to an hour or two, when a recurrence of the exacerbation ensued in excess of the previous attack.

Suffering from repeated sieges, at the habitat of chagres fever, with paroxysm at sea, the appearance of patients on arrival at quarantine can not be readily described. Every feature was stamped with an expression depicting anxiety, pain, and helplessness. Barely able to sit erect, limp, and seemingly lifeless, the limbs unable to perform their functions, they were carried from their berths to the ward.

The exacerbation was marked by an exceedingly high temperature, a full, bounding pulse, and the intensity and location of the headache, especially pathognomonic.

It is a recognized fact that the headache of yellow fever plays a conspicuous feature in diagnosis, and this rule is applicable to chagres fever. It may be readily recognized as intensely exerting at the crown of the head, radiating to and including the occipital region, its intensity again found at the base of the occiput, while in other types of malarial fever headaches are vague and indifferently explained.

The pupil of the eye is dilated slightly, and brilliant, not the watery, suffused eye of the average case of malarial fever, and without discoloration or injected.

* By M. J. Lehman, M. D., Acting Assistant Surgeon, Marine-Hospital Service, Gulf quarantine.

The epigastrium is not excessively tender on pressure, generally not at all painful, nor does there exist any undue enlargement of the liver or spleen—a congestive condition of these organs being the exception.

It is in the remission that a series of conditions are exhibited worthy of observation. The features are haggard, and just previous to an exacerbation, the exhausted patient bears an expression remarkably similar to the yellow fever patient, when suppression is about to supervene.

The eye is unsuffused, rapid and dull; the *alæ nasi* pinched; the lips colorless and contracted; the gums natural; the tongue rounded, broad (very slight), pointed on exposure, sordes lightly marked and lightly coated; little tendency to nausea or vomiting; urine high colored, ample, alkaline, an excess of urates and phosphates, with absolutely no trace of albumen; bowels constipated; feces, gummy, dark colored and fetid.

While observations of such symptoms can be remarked in other types of malarial fever, in chagres fever they are impressed with additional importance, a type peculiar to itself, unlike other types of remittent fever, at stages demanding the free use of thermometer and tests so as not to confound it with yellow fever.

The malarial influence in chagres fever is unlike that in other types. The sequelæ in chagres fever is sufficiently convincing of this assertion. The exigencies of the service and the occupation of the patients prevented a continuation of observation after convalescence had ensued, for on departure of their respective ships they passed beyond further study.

At the time of departure, free from fever it is true, the most perfect and physical specimen of sturdy manhood becomes infirm and a wreck. Languid, pallid, however desirous of performing duties aboard ship, with the system broken down, they were mere mechanisms unable to perform a tithe of their required duties.

It may be presumed that a sea voyage at this stage (oft prescribed as a curative in malaria) would prove beneficial, but data now at hand from a patient who suffered from an aggravated siege of chagres fever at the Gulf quarantine, over a year ago, and who has circumnavigated the globe since, “a magnificent opportunity for the sea air to dissipate the malarial influence” is convincing that such is not the case, writing as he does, “I never expect to be the man again that I was before going to Colon.”

Whether the *causi morbi* in chagres fever affects primarily the ganglia and nervous system or whether its force is in excess of our local malarial influences, is a query I am unable to answer.

From critical observation and comparison with types of malarial fevers seen in various sections of the Gulf States and Mexico, I have no hesitation in asserting, in symptoms, duration, and result, it is distinctly a type, low, vicious, and even in years pending its exhibition, leaving its impress upon the constitution, shattered by its invasion.

No specific treatment can be advanced. Passed Assistant Surgeon H. R. Carter (in command) at the Gulf quarantine, gave quinine liberally and in large doses as well as saline purgatives. I occasionally varied specified treatment by giving minute doses of hydrarg. chlo. mit. as well as small doses of quinine. Free from fever, tonics were administered, particularly the acids, both forms of medication answering all purposes. One peculiarity at the outset of convalescence was the feeble condition of the heart and circulation—more or less marked—resulting in one case (see clinical record attached) nearly with fatal results. Under such conditions alcoholic stimulants were freely administered.

In submitting these observations I respectfully suggest the propriety of carefully studying types of malarial fever as presented in various sections. Reducing all opinions, ideas, and views to facts, a better knowledge of the vast, unknown element, malaria, may yield a possible result, in due time adding a connecting link between the germ of malaria and the germ of yellow fever.

CLINICAL RECORD.

Fritz, Jansen; aged nineteen; native of Russia; sailor on German bark *Jacobine*; was confined to the fore-castle from the hour of departure of bark from Colon. On arrival at quarantine, September 4, 4 p. m., he was placed in the hospital. His condition was extremely critical, having had fever continually for a week. (No record of temperature taken on voyage.)

Extreme debility; pulse 88; temperature 36°; administered hypodermic quiniæ bisulph. and tr. opii. Whisky ordered freely (ordered by P. A. Carter). At midnight, temperature 40; pulse intermittent and thread-like; breathing hurried; cyanosed; semi-comatose. Dr. Lehman ordered at once tr. digitalis gtt. xx and mustard plaster to chest.

September 5, 6 a. m., pulse, 94; temperature, 39; 6 p. m., pulse, 80; temperature, 38.3; 8 p. m., pulse, 80; temperature, 38.1; 10 p. m., temperature, 37.4; September 6, 2 a. m., temperature, 37.2; dyspnoea not so excessive, but manifestly due to heart failure. At 6 a. m., pulse, 76; temperature 36.3; and administered atropiæ. At 4.15 p. m., pulse, 72; temperature, 37.2. September 7, 6.30 a. m., pulse, 72; temperature, 37.1; 6.30 p. m., pulse, 72; temperature, 36.4. September 8, patient exceedingly feeble, but free from fever. This patient was regarded as critically ill, and at the time of his discharge and return to bark, three weeks after, was debilitated to such an extent that he could barely walk across the floor.

John Kungar; aged twenty-two; Dane; sailor on bark *Jacobine*. Previous history of fever similar to above case. Admitted September 4, 4 p. m.; pulse, 108; temperature, 40.2; 5.30 p. m., pulse, 120; temperature, 41; 11 p. m., pulse, 96; temperature, 40.3; 5, 6 a. m., pulse, 68; temperature, 37.4; 6 p. m., pulse, 90; temperature, 38; 8 p. m., pulse, 66; temperature, 38.2; 6, 6 a. m., pulse, 84; temperature, 39.2; 4 p. m., pulse, 72; temperature, 38; 7, 6 a. m., pulse, 72; temperature, 37; 6 p. m., pulse, 84; temperature, 37.3; 12 p. m., pulse, 72; temperature, 36.2.

Treated freely during pyrexia and remission with quiniæ hypodermically and by mouth. Discharged September 13 free from recurrence of fever, but suffering from debility.

William De Meyers; aged twenty-nine; nativity, Holland; residence, New Orleans. Had left the U. S. Marine Hospital at New Orleans, where he was convalescing from fever, early in June, and joined the schooner *J. M. Fitzpatrick* at Pearl-ington, Miss., as mate, bound for Colon, clearing June 7. The schooner lay at Colon for thirty days, and on departure the captain, mate, and four of crew were more or less ill with premonitory symptoms of chagres fever, and on arrival at quarantine, excepting the master, the crew were removed to the hospital. He was seen by Dr. Lehman on board and previous to anchoring 2 p. m., August 26. (When boarding the ship he was at the gangway with the captain.) Observation: Pulse 120, full, rolling; temperature, 39.3; tongue broad, rounded, coated, slight sordes. Enunciation deliberate, rational, coherent. No hallucination, delirium, or drowsiness; no epigastric uneasiness or tendency to vomit; skin warm, moist, not pungent; perspiration ample and free; kidneys and bowels acting; no jaundice of skin or eyes; no ecchymosis.

He had been subjected to light fevers occasionally during voyage to and from Colon. He was removed to and admitted to hospital at 7 p. m., and, though rational, he was extremely feeble—pulse, 150; axillary temperature, 40½. Prescribed quiniæ sulph., 1.33; hydrarg. chlor. mit., 66. Chart. No. 1. Iced water was given freely before and after medication without provoking retching or epigastric uneasiness.

At 11.30 he was sinking—comatose; at 12.30 he died.

His dissolution was without any revulsion of stomach or bowel, convulsions of any kind, nor was there any hemorrhage. At 6 a. m. the cadaver assumed a jaundiced color, eyes as well, *without ecchymosis* or decomposition. No necropsy was held, as it was a pure, typical case of chagres fever.

}

;

;

e

t

e

s.

e

is

g

i-

tt

.,

ie

r-

ll

en

se

s-

h.

un

y,

on

a

nd

be

se

d,

o.

nd

on-

on

of

re-

hn

cs,

is

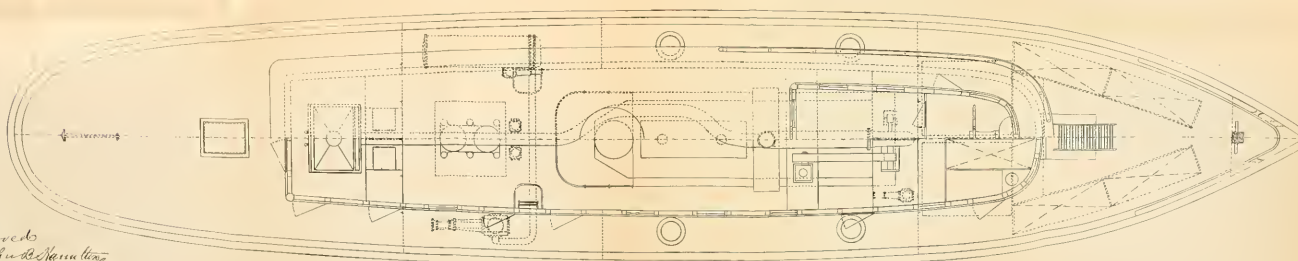
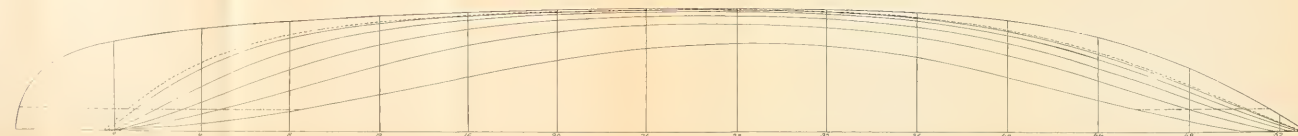
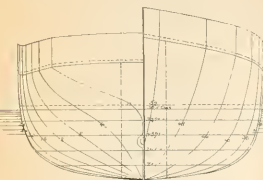
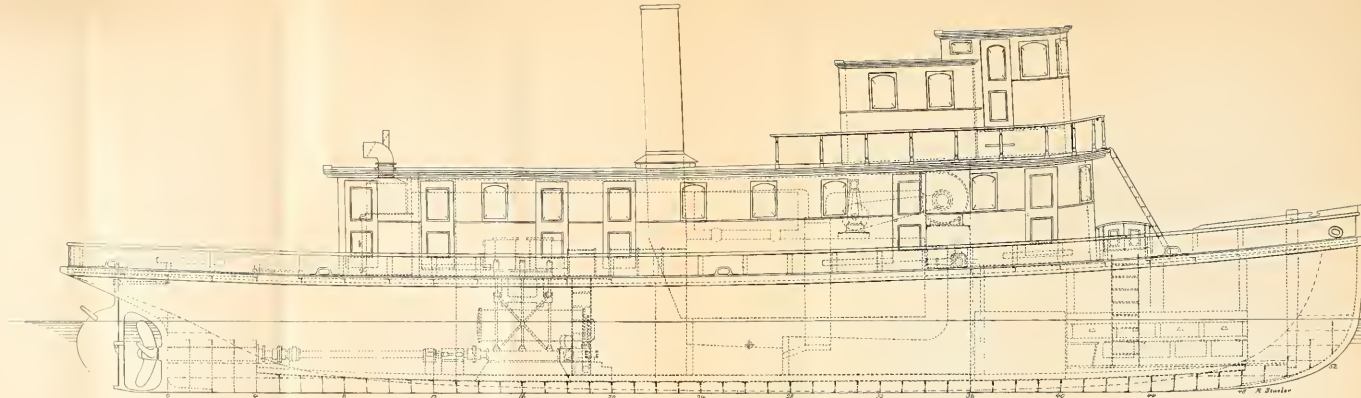
ht.

U. S. MARINE HOSPITAL SERVICE.

PLAN OF
FUMIGATING TUG

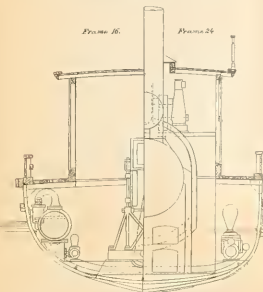
FOR USE AT
CHANDELEUR QUARANTINE STATION.

Length on Water Line	40 Feet
Breadth of Beam	12 Feet 6 Inches
Depth of Hold	5 Feet 10 Inches
Depth of Water	4 Feet 6 Inches



Frame 16.

Frame 24.



Approved
John B. Spurr
Superintendent Surgeon General

;
3-
e
it

e
s.
le
is
g
i-
at
l.,
re
n-
ll
en
se
s-
h.
un
y,
on
a
nd

be
se
d,
fo.
ad
n-
on

of
re-

hn
ks,

is
ht.

The patient stated he had suffered from fevers during voyage, as specified above; was spoken to on arrival, and while attending to his duties as mate as well as possible in his condition, thoroughly rational, all organs acting naturally; and while his demise was sudden there was no iota of foundation for any diagnosis but that rendered—chagres fever.

QUARANTINE APPLIANCES.

Plans have been prepared by the construction department of the Revenue-Cutter Service for the building of three fumigating steamers. These steamers have iron hulls, and are provided with sulphurous oxide furnaces and tanks for the mercury solution. A plan of the vessel is subjoined. An error was made by some of the designers in calculating the displacement, and the machinery had to be shifted from the position at first laid down in the plan. An investigation showed that the contractors, the Pusey and Jones Company, of Wilmington, Del., had complied in all essentials with the specifications, the cost of the alterations, therefore, had to fall upon the Government. The remaining vessel was lengthened before launching, which, it is presumed, will correct the error of displacement noted in the other two vessels. When these vessels are completed and in order, they will greatly increase the facility with which a ship in quarantine can be fumigated and disinfected. The cost of the vessels under contract was \$22,500 each. Bids were opened for the construction of a similar vessel for use at San Francisco. The bids were \$26,800, \$27,500, and \$31,000, respectively, and were deemed beyond the amount of the appropriation. The Union Iron Works of San Francisco subsequently submitted a plan for a fumigating steamer that they would furnish, complete, for \$25,000, and that plan is now under consideration.

At each quarantine wharf proper disinfection machinery should be provided for the application of steam disinfection, and the plan in use at New Orleans by the board of health has been materially modified, as will be seen by the examination of the accompanying plans, "No. 224." By this apparatus either moist or dry heat may be applied, and the "jacket" chamber is believed to be at once the most simple in construction and the most efficient. This machine will be put in operation at San Francisco as soon as possible.

Boarding steamers have been designed by the superintendent of construction of the Revenue-Cutter Service, and bids have been received for their construction as follows:

On the Atlantic coast: The Pusey and Jones Company, \$34,210; John H. Dialogue, \$30,440. On the Pacific coast: The Union Iron Works, \$49,000, and the Risdon Iron and Locomotive Works, \$55,967.

No award has been made for these steamers up to this date, as it is deemed best to secure from the bidders a guaranty of speed and draught. Some delay has therefore resulted.

Movable machinery.

The late epidemic developed the fact that neither the Government nor the States were prepared on short notice to disinfect the fomites in an infected village by moist heat. The sulphur process always causes more or less damage to the goods subjected to it, and it occurred to me that some such machine as has been designed for the wharves, to be placed on car trucks, with axles at standard gauge, would be of great service in any place where rapid steam disinfection was needed. This machine could, when constructed, be sent anywhere on any ordinary railroad line. The Supervising Architect has cleverly embodied the idea in the accompanying plan, No. 224. In case of a localized epidemic, as well as the more general ones, State boards of health can be well aided by the loan of this apparatus, which should be always ready for exigencies.

THE HYGIENIC LABORATORY.

The establishment of an experimental laboratory for hygienic purposes in the building now rented as a hospital at New York was mentioned in the last report (page 11). Its usefulness is unquestionable, but if it were transferred to this capital much time might be saved and the work made directly a part of the Bureau. The special investigation of the causation of yellow fever can not well be conducted away from the yellow fever zone, and the President has authorized from the epidemic fund the expenditure necessary for the establishment of a special hygienic laboratory at the Key West quarantine station on Tortugas Keys. Nothing has been neglected in its equipment that would in any way add to its efficiency. This sets free the general laboratory at New York from this special work. An officer specially trained for the investigation has been assigned to take charge of this quarantine station and conduct the operations in the laboratory (Assistant Surgeon H. D. Geddings).

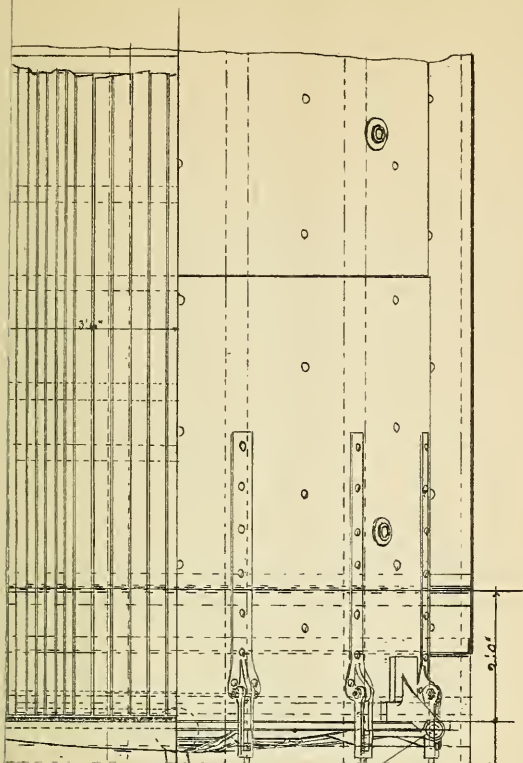
A summary of the work performed in the New York laboratory, as conducted by Assistant Surgeon Kinyoun, is as follows:

Report of work in the laboratory.

During the past year a large addition of improved apparatus has been added to the laboratory of the service at the port of New York, including special apparatus for the cultivation of anærobic microbes and for experimental studies on fever.

A lengthy series of experiments in disinfection as applied to quarantine is about completed. Of the gaseous disinfectants, viz, bromine, chlorine, nitrous oxide, and sulphur dioxide, the latter was found to have the widest range of application, it possessing a greater degree of penetration in the presence of moisture than the others. The greatest disadvantage is that, while possessing superior penetrating powers, it has no effect on the spores of micro-organisms.

As low a percentage as 2 volumes per 100 was found sufficient to destroy the vitality of the principal non-spore bearing pathogenic micro-organisms, cholera spirillum offering the least resistance. Ten per cent. of sulphur dioxide was found to be a good working quantity for all substances. During the summer of 1888, while yellow fever



ne claims
ge of ap-
ever.
al value
od from
ariae was

been en-

ted from
nd Lake

alent at
wards of
umoniae
ocal and
ng both

arer the
re state-
is 'so far
besides

ptember

ie obser-
the skin
hailing

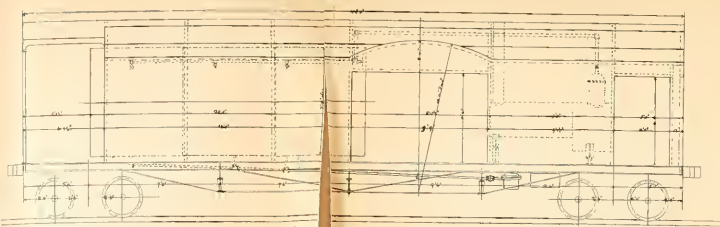
ethod of
l by the
culosis;

no space

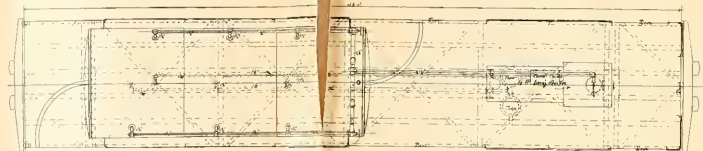
as pur-

upplies
Marine

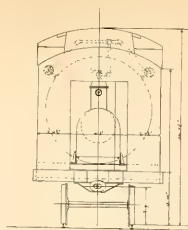
upplies
ayable
Camp,
of yel-



Elevation of Car.



Plan of Car.



Traveling Sprinkling Tank

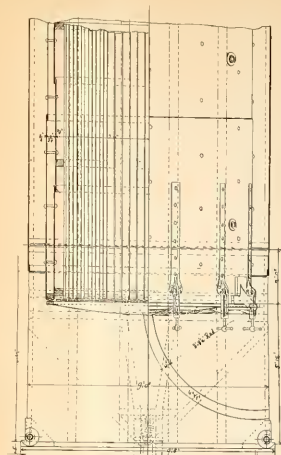
for the
U. S. Marine Hospital Service.

Scale 3/4" = 1'-0"

John D. Hamilton
Superintending Engineer General
Marine Hospital Service

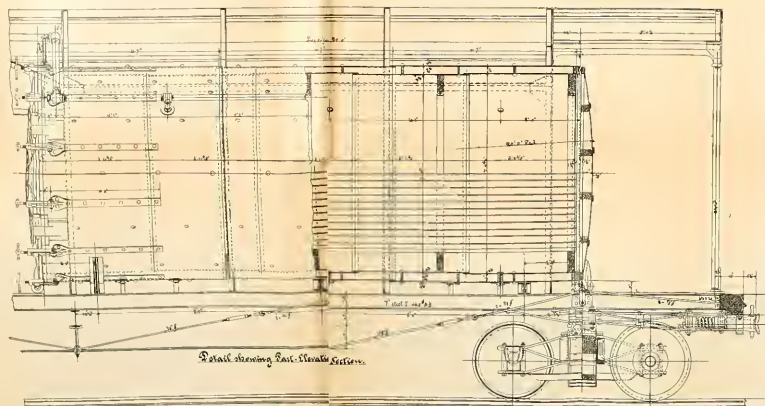
James Hamilton
Superintending Engineer
Marine Hospital Service

at New York

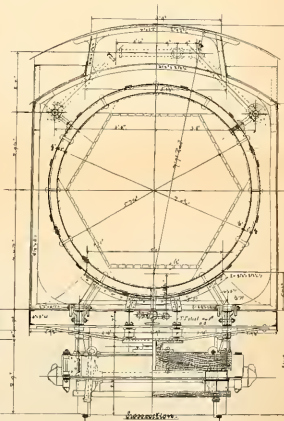


Side of Tank Section.

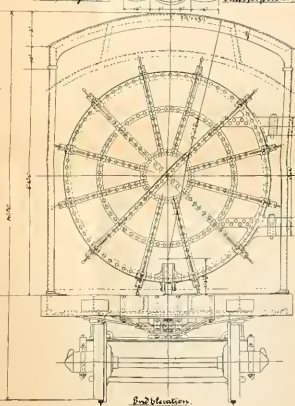
Side of Tank Section.



Detail showing Tank, Wheel Section.



Front View.



Rear View.

ie claims
ge of ap-
ever.
sal value
ood from
ariae was

been en-

ted from
nd Lake

alent at
wards of
umoniae
ocal and
ng both

arer the
re state-
as 'so far
besides

ptember

ie obser-
the skin
hailing

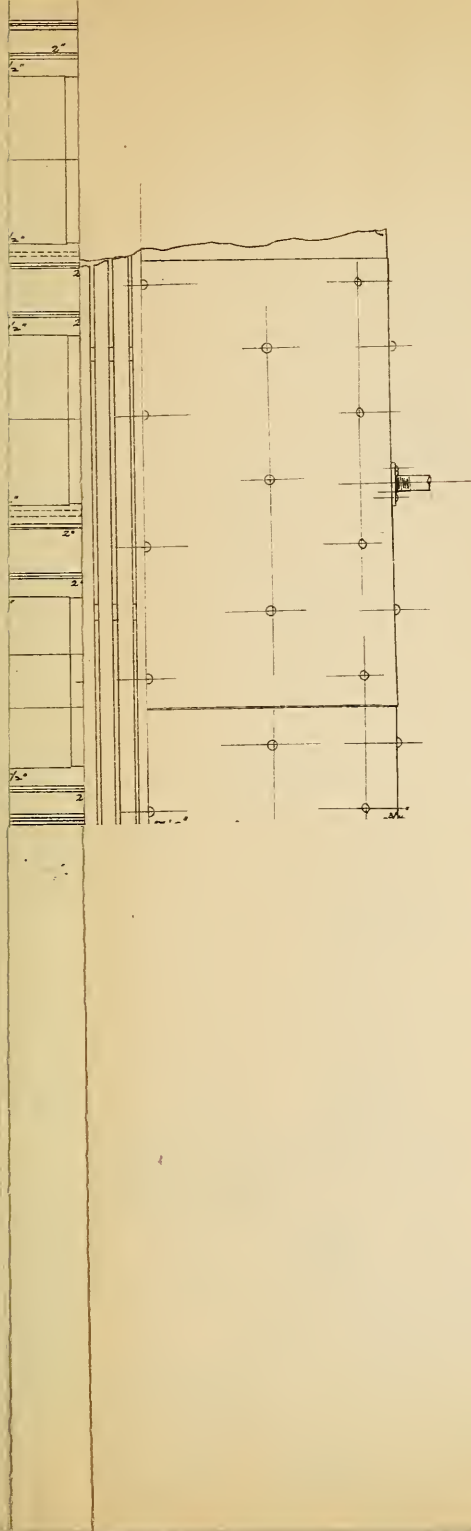
ethod of
l by the
culosis ;

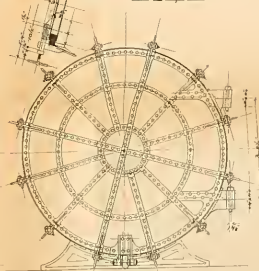
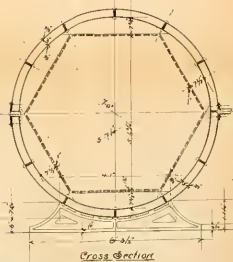
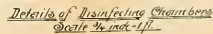
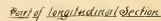
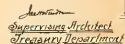
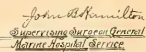
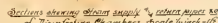
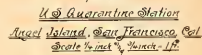
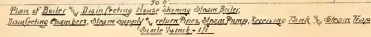
no space

as pur-

upplies
Marine

upplies
ayable
Camp
of yel-





was epidemic in Florida, attention was directed to phosphorus pentoxide; the claims set up for it were that it was a sure and safe disinfectant, having a wide range of application; that its use was common in Demarara for disinfection in yellow fever.

This agent was given a thorough trial and was found to have no practical value (*vide* Abstract, December 14, 1888). A microscopical examination of the blood from ninety cases of the different types of malarial infection, the plasmodium malarie was found in eighty-eight.

In another series of cases—enteric fever—two cases of mixed infection have been encountered.

The malarial organisms were found in the blood and the bacilli were isolated from the stools. Chemical analyses of samples of water from Camp Perry, Fla., and Lake View, Chicago, were conducted by Assistant Surgeon Geddings.

During the months of March and April, 1889, when pneumonia was prevalent at this port, bacteriological examinations were made of the sputum, and afterwards of the organs obtained at three post-mortem examinations; the diplococcus pneumonie was demonstrated in all, this fact suggesting that the disease is first local and afterwards becoming systemic. In one case of lobular pneumonia, affecting both lungs, the organism was found in the lungs and other organs.

Experimental studies are now being conducted in the hope of making clearer the etiology and pathology of the pneumonie following traumatism. No positive statement can yet be made on account of insufficient data, but all the observations so far point conclusively to the fact that there must be some predisposing cause besides traumatism for its production.

The micro-organism described by Dr. Carlos Finlay (*vide* London Lancet, September 1, 1887) has been under observation during the past year.

Experiments made upon various animals gave no results. Later, while the observations on malarial fever were under way, this organism was discovered upon the skin of a majority of the patients suffering from malarial fevers, the patients hailing from Portland, Me., to Vera Cruz, Mexico.

At the present time special investigations are being made (1) on Weigert's method of treating tuberculosis (see abstract No. 36, 1889); (2) the role that is played by the hands of nurses and assistants, as infective agents to wounds; (3) On tuberculosis; (4) On the pathogenesis of anaerobic micro-organisms.

The room at present available for the laboratory is entirely too small, and no space is available for photography.

PURVEYING DIVISION.

The following table shows the character and cost of supplies purchased for issue during the year:

Medical supplies	\$14,671.44
Hospital stores	6,160.03
Hospital sundries	5,714.48
Surgical instruments and appliances	5,705.04
Bedding and clothing	5,639.19
Medical books and journals	1,362.24

Four hundred and seven requisitions for medical and other supplies have been filled to meet the wants of the eighteen United States Marine Hospitals and forty-seven other relief stations of the service.

Five of the national quarantine stations have received their supplies of medicines and appliances through this division, and all bills payable by the Government for articles supplied to Jacksonville, Fla., Camp Perry, and all other Southern points during the recent epidemic of yel-

low-fever, have been received and examined in this division before payment.

Through the purveying division, also, the various vessels of the Revenue Marine Service have been provided with requisite medical supplies.

By request of the Surgeon-General of the Navy, medicines were consigned to the United States steamer *Thetis* at San Francisco to be used by the officers of this vessel in extending aid to suffering sailors of the merchant marine, during the cruise in Behring Sea and the Arctic Ocean, and finally a complete outfit of medical supplies was placed aboard the United States revenue steamer *Bear* for the use of the new refuge station established at Point Barrow in the Arctic Ocean.

By request of the chief of division of stationery, printing, and blanks, chemical and other tests have been made of various samples of muelage and ink, and their relative merits determined.

In conclusion it should be noted that the work connected with the quarantine service, which has been engrafted upon the purveying division, has resulted in the overburdening of the latter. A distinct separation of the two divisions would result in a more perfect administration of both, and the necessity for such separation has become more urgent during the past year by reason of the construction of quarantine plants (hospitals, warehouses, wharves, fumigating furnaces, boarding steamers, etc.,) and the operations of these new stations.

The work of this division of the Bureau increases *pari passu* with the increase of the service, but the outfitting of the new quarantines and the purchases of the laboratory supplies have materially added to the work of the division this year. Its consolidation with the quarantine division works to its disadvantage somewhat, as time is necessarily taken from purveyor's work to give to the preparation of the abstract and the exigencies of the quarantine service. The additional laborer authorized by the last appropriation act has been appointed, and the work of receiving and shipping supplies is more easily accomplished.

THE ORGANIZATION OF THE BUREAU.

I am of impression that it will be of material advantage in understanding the work and operations of the Bureau if I give in detail the present organization and assignment of the little force employed. The officers are, the Supervising Surgeon-General, one surgeon, and one passed assistant surgeon, each serving in the Bureau under detail from the Service; the labor is thus divided:

1. General service, under a passed assistant Surgeon detailed as acting chief clerk (now Assistant Surgeon Magruder).

Mr. W. S. Parks (third-class clerk), Mr. John C. Rowland (third-class clerk), Mr. Geo. W. Collison (third-class clerk), Mrs. Emma Griffin (first-class clerk), Miss A. J. Sorrells, Miss A. L. Mallory, Mrs. F. F. Meany and Miss E. R. Jones (copyists), and messenger, T. Williams.

The following classes of papers are assigned to Mr. Parks :

Traveling-expense accounts, pay-rolls, longevity accounts, etc., bills for personal expenses, epidemic bills other than for supplies, stationery and blank requisitions, all letters relative to appointments, changes of employes, etc., mailing of checks, changes of stations, etc., official orders, lists and time reports, leaves of absence, and commutation bills.

Mr. Rowland is stenographer for the Surgeon-General and for the acting chief clerk. All official letters sent are entered and mailed by him, with the exception of letters transmitting checks; he makes requisitions for printing and binding of medical journals, books, etc.

The following class of work is assigned to Mr. Collison :

Keeping the accounts that pertain to the expenditure and receipts, in a consolidated and detailed manner. The accounts for each appropriation are alphabetically and numerically arranged and embrace the appropriations for the "Marine-Hospital Service," "Quarantine Service," "Preventing the Spread of Epidemic Diseases," "In aid of Yellow Fever Sufferers;" keeping a record of tonnage tax collected; examination, record of accounts for repayments for care and treatment of foreign seamen; examination, record, and reference of accounts that require settlement through the First Auditor; record and reference of all accounts settled by transfer warrant; record of unclaimed money and valuables of deceased seamen; checking and numerically arranging receipts for checks, etc.; record of expenditures authorized from annual appropriations.

Mrs. Emma Griffin is in charge of the files; addresses labels for reports, circulars, etc.; keeps records of same mailed; examines telegram bills, etc.

Miss E. R. Jones, translator and copyist, and attends to scrap-books, and engrosses letters sent from the Bureau.

Mrs. F. F. Meany, translator and copyist, and indexes current letter-book, and engrosses letters sent from the Bureau.

Miss A. L. Mallory enters all incoming mail in the register, also the action taken; engrosses all letters signed by the Secretary, Assistant Secretaries, and the Supervising Architect on business relating to the Service, and indexes the same.

Miss A. J. Sorrells, type-writer. Number of letters, etc., written is over six hundred per month.

2. Relief division (under charge of acting chief clerk), Mr. J. Maclean (fourth-class clerk), Miss M. A. Black.

Mr. Maclean performs the following work :

Examination of all daily reports, relief certificates, permits and applications for extension of permits, all relief bills except bills for care of foreign seamen, and tabulation of all medical officers' reports, bills for transportation and burial of seamen, preparation of all letters authorizing relief or transportation, record of relief furnished.

Miss Black makes a permanent record of the age, nativity, dates of admission to and discharge from hospital, and disease for which they are treated, of all seamen furnished relief in the U. S. marine hospitals; also examines and compares all monthly medical and surgical reports received, indexes all letters transmitting checks sent from the office, and prepares part of the statistical work of the annual report.

3. Purveying division and quarantine division (under a surgeon detailed from general service, now Surgeon W. Wyman). Mr. W. P. Worcester (third-class clerk), Mr. G. A. Gustin (third-class clerk), Miss D. E. Quin (copyist), Mr. H. Gahn (hospital steward and chemist), and three laborers.

Mr. Worcester examines all accounts and bills for subsistence supplies, medical supplies, fuel, lights, and water, furniture, etc.; enters medical invoices, etc.

Mr. Gustin prepares schedules for proposals for medical and other supplies and orders the supplies, invoices all supplies sent out, makes requisitions for and issues stationery to the office, makes semi-annual report of property on hand in the Bureau, prepares a weekly abstract of sanitary reports, and acts as stenographer in the purveying and quarantine division.

Mr. Galin prepares the original schedule of supplies; receives and examines supplies, keeps a record of and examines bills for same; manufactures pharmaceutical preparations, supervises bottling and labeling, and keeps a "laboratory journal;" fills requisitions, supervises the packing and shipping, makes out the packing lists and original invoices, and keeps a packing and shipping record; keeps "record of supplies issued."

Miss D. E. Quin examines all "property returns" of the service and quarantine stations (about ninety semi-annually); attends to the correspondence relative thereto; prepares and sends error sheets, etc., and mails the weekly and quarterly medical journals to the officers at different stations.

Additional force needed.

The existing statutes prevent the permanent detail of officers to the Bureau in excess of the number specifically allowed by law. The language of the statute is as follows:

And no civil officer, clerk, draughtsman, copyist, messenger, assistant messenger, mechanic, watchman, laborer, or other employé shall hereafter be employed at the seat of Government in any executive department or subordinate bureau or office thereof or be paid from any appropriation made for contingent expenses or for any specific or general purpose, unless such employment is authorized and payment therefor specifically provided in the law granting the appropriation.

But for this prohibition an additional officer would long since have been permanently detailed to have charge of one of the two divisions of this Bureau, now consolidated. The officer now detailed as chief of the purveying and quarantine divisions has too much work to attend to it properly, there is too much hurry, and matters which require time for consideration do not receive it. I am sure that if my recommendation prevails, the work of the Bureau will be carried on more smoothly. As it is now, there is always a strain, always a little extra work, and a little extra time required of the clerks, and night after night has frequently found the officers engaged in official duties at the Bureau. The preparation of the Weekly Abstract is a work which will take all the time of one man, if properly published, and while I am not aware that it has been neglected, I think it might be considerably improved if more time could be spared for its preparation. One additional clerk is needed to compile the statistics for the abstract. The estimates herewith submitted provide for the changes in the force deemed necessary at present.

Pay of the laborers and messengers.

The pay of the messenger in this Bureau is \$600, while that allowed the messengers in other bureaus of the Department is \$840. Of the three laborers, two receive \$480 each per annum, and the other \$360 per

annum. These amounts are inadequate compensation for the work performed. The work required of these men is exacting, and their pay should be commensurate with their duties. I have submitted an estimate for the increased amount necessary to make their pay equal to that of other employés of the Department performing similar service.

CHANGES IN THE MEDICAL CORPS.

The casualties include the death of Passed Assistant Surgeon Urquhart and the resignation of Passed Assistant Surgeon Guitéras. Dr. Urquhart was taken sick while in Florida, but he did not deem it of a severe nature. Shortly after his assignment to duty at Evansville, however, his sickness became severe, and he died after a lingering illness. He was a faithful officer, and performed efficient service in the quarantine service at Cape Charles and during the Florida epidemic.

Dr. Guitéras is well known as a skillful clinician, as especially expert in the diagnosis of yellow fever, and as a valuable officer. He resigned to accept a professorship in the medical department of the Pennsylvania University. This report elsewhere contains the result of Dr. Guitéras's observations on the diagnosis of yellow fever.

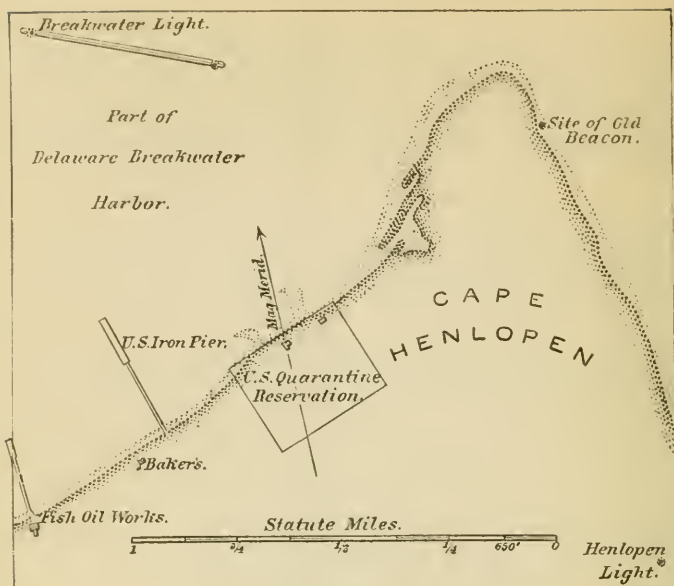
One assistant surgeon was promoted to be passed assistant surgeon, and six persons have received appointments as assistant surgeon after passing the examination required by regulations.

The law regulating appointments in this service is accepted by the officers as a pleasant recognition by Congress of the value of their services, and its passage has already enabled the Bureau to raise the standard of qualifications. The entire freedom from political control, and the assurance that the best examination will secure the first appointment, has been of great advantage to the service.

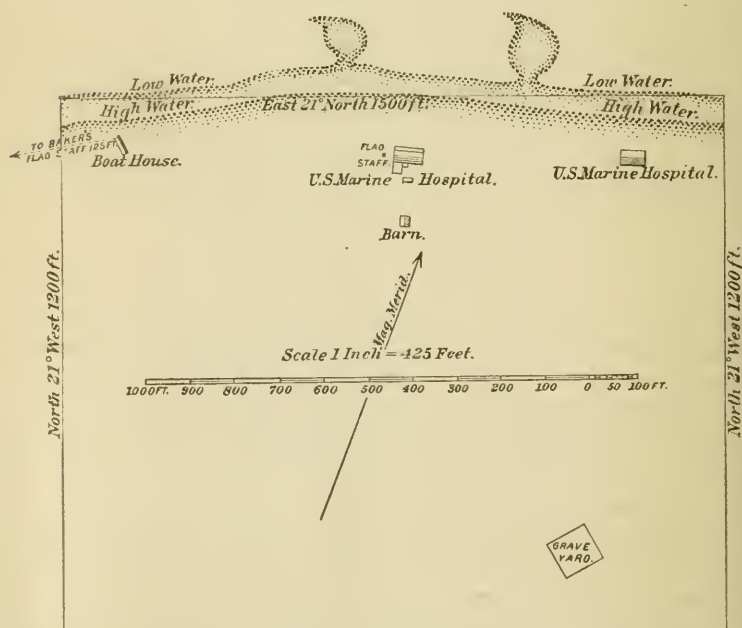
NATIONAL QUARANTINES.

Cape Charles, Virginia.—The appropriation contained in the act of August 1, 1888, for the establishment of this station was only used for the expenses of the fiscal year ended June 30, 1889. There is a balance of \$97,403 to the credit of this appropriation, all of which will be needed for the purchase of the site, construction of the buildings, and steamers. Work on this station has been delayed on account of the difficulty of procuring a title for the site. The matter is now pending in the Department of Justice, no report having been received from that Department in regard to it. I have been unofficially informed that proceedings in condemnation will have to be had before the title can be secured. Under section 355 of the Revised Statutes nothing can be done toward equipping this station until the title shall be vested.

Delaware Breakwater, Delaware.—The title for this station now belongs to the United States, and work will soon be commenced toward equipping the station. The appropriation, however, will not allow it to be



QUARANTINE STATION AND VICINITY.



The above is a draught of the lands ceded by the State of Delaware to the United States for a quarantine station, by an act of assembly passed at Dover, April 12, A. D. 1889, and surveyed and located pursuant to the provisions thereof by A. H. Fisher, on the 28th and 29th of May, 1889.

HIRAM R. BURTON,
DAVID L. MUSTARD,
FRANKLIN C. MAULL,
Commissioners.

BENJ'N LEE,
Agent for the United States.

er 1
De-
tion
ited
that
t be
the
nder
the
thus
oard
es in

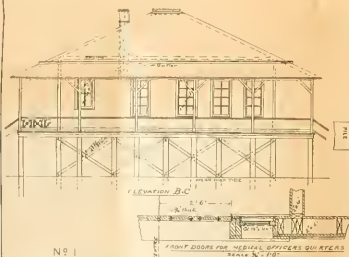
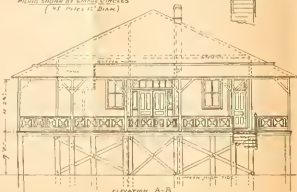
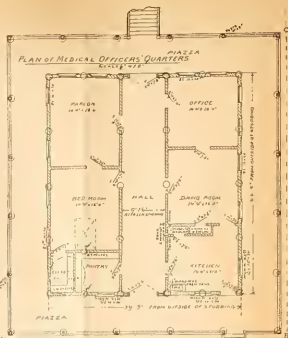
been
d to
tug,
for,
ts is
; in-
ant,
the

rted
Key
the
sked
ans-
and
to a
ll be
uffi-
ory.
d in
con-
site
and

port.
sur-
by a

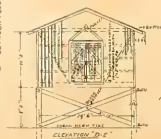
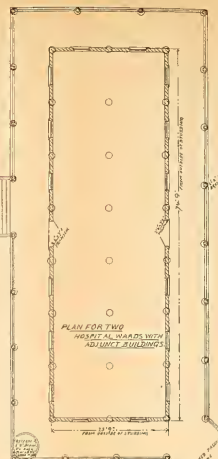
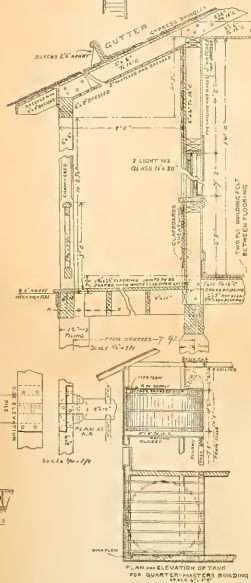
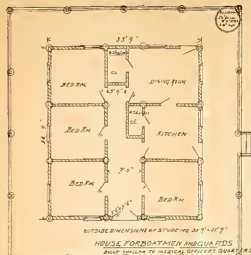
this
mili-
sta-

War Department it was declined, on the ground that the place selected

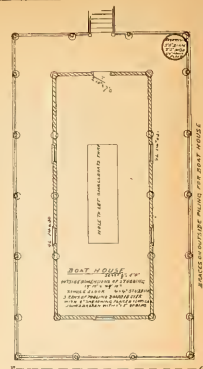


NO 1
U.S. QUARANTINE STATION,
NORTH CHANDELIER ISLAND,
GULF OF MEXICO

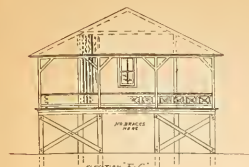
A. J. F.



ALL BUILDING MATERIALS TO BE SHIPPED BY STEAMER TO THIS QUARANTINE STATION. ALL BUILDING MATERIALS TO BE SHIPPED BY STEAMER TO THIS QUARANTINE STATION. ALL BUILDING MATERIALS TO BE SHIPPED BY STEAMER TO THIS QUARANTINE STATION.



ALL BUILDING MATERIALS TO BE SHIPPED BY STEAMER TO THIS QUARANTINE STATION.



Boarding and
inspecting grounds

Quarantine Anchorage
and
Reservation

- 1 Surgeons Quarters
- 2 Boatmen Quarters
- 3 Hospital
- 4 Lazaretto
- 5 Dockage for Transfer barge
- 6 Boathouse, close to Boatmen Quarters

WILL A. FRERET
Superior Architect
TREASURY DEPARTMENT

kept open throughout the year, and it will be closed on October 1 next. It was supposed the title in this ground rested in the War Department, but on investigation it was found that the military reservation on which the quarantine buildings are now placed was ceded to the United States for the purposes of a military fortification, with the proviso that the property should revert to the State of Delaware should it not be so used. An act of the legislature was therefore required, ceding the jurisdiction to the United States for quarantine purposes, and under this act commissioners were appointed by the United States and by the State of Delaware, respectively, to fix the boundaries of the land thus ceded. Dr. Benjamin Lee, secretary of the Pennsylvania State board of health, courteously acted as commissioner for the United States in this matter.

Gulf Quarantine—North Chandeleur Island.—The buildings have been completed and the officers and employés removed from Ship Island to this station. The lazaretto has been constructed. The fumigating tug, which will also be used as the boarding steamer, has been contracted for, and all that is necessary to make the station complete in all respects is the construction of a wharf built on nearly the same plan as that intended for the quarantine at San Francisco. The disinfecting plant, however, will not be so extensive. The accompanying cut shows the details of the building at Chandeleur Island.

Key West Quarantine.—The board appointed to select a site reported that the place most available for the new quarantine station near Key West was at the Tortugas Islands, and Garden Key and Bird Key the most available for the purpose named. The War Department was asked to make the transfer of these islands, and accordingly made the transfer as requested. A new wharf will be needed at Tortugas Key, and will be built during the winter. In connection with the lazaretto a laboratory for the investigation into the causes of yellow fever will be constructed. The President has authorized the expenditure of a sufficient amount of the epidemic fund for the equipment of this laboratory.

Port Townsend Quarantine.—Much difficulty has been experienced in the selection of a site for the quarantine at this station, owing to conflicting interests. The report of the board appointed to select the site was opposed by the board of trade and many influential citizens, and several different sites have been named.

Action thereon has not been completed at the date of this report. The inspection of vessels, however, is going on, an acting assistant surgeon being placed in charge of the station. Vessels are boarded by a small boat.

San Diego Quarantine.—The board appointed to select a site for this station reported that in their judgment a portion of the extensive military reservation at that place was most suitable for the quarantine station of any in the vicinity of that port. Request being made of the War Department it was declined, on the ground that the place selected

was reserved for a military fortification, when one should be ordered, and the acting assistant surgeon in charge of the quarantine was directed to report on a new site. He made report, choosing a portion of the military reservation still further down the bay; and the War Department has been asked to transfer this property. The matter is still pending.

San Francisco Quarantine.—It is intended to provide this station with a most complete equipment, as there is no local quarantine at San Francisco, and the growing commerce of that port makes the construction of this quarantine of the first necessity. The War Department, on request, transferred a portion of Angel Island, in San Francisco Harbor, for quarantine purposes. A more desirable place for quarantine could scarcely have been found in the entire sea-board of this coast. The accompanying plans show the nature of the improvements proposed to be constructed.

South Atlantic Quarantine.—This station was originally transferred to the Treasury Department by the National Board of Health, and it was supposed they had authority for so doing. The records of the Navy Department, however, did not show that formal authority has been given to the National Board of Health, and the property was therefore formally transferred, on request of the Department, by the Secretary of the Navy. Extensive improvements and alterations in the buildings have been made, and a wharf is now in process of construction. The appropriation, however, is insufficient to complete the wharf. It has been commenced at 14 feet of water, and a row of sheet-piling will be driven from the end of the wharf on which the warehouse is constructed toward the shore, as far as the amount of the appropriation will allow. In this, as in other wharfs, it is proposed to utilize the ballast from vessels in solidifying them and for filling between the piles.

ADDITIONAL LEGISLATION NEEDED TO PERFECT THE QUARANTINE SERVICE.

The following letter from the United States attorney for the southern district of Georgia is self-explanatory, and shows what additional legislation is needed to secure a better command over the movements of persons detained in quarantine.

OFFICE OF UNITED STATES ATTORNEY,
SOUTHERN DISTRICT OF GEORGIA,
Macon, Ga., September 2, 1889.

SIR: Dr. J. H. White, Passed Assistant Surgeon Marine-Hospital Service, in charge of South Atlantic Quarantine Station, in Sapelo Sound, reported to me, under instructions he states, the case of one John Malcolm for prosecution for violation of the national quarantine laws. The facts of the case are as follows:

While the bark *John Fough* was lying at said quarantine station a permit was granted by the quarantine authorities of McIntosh County to Malcolm, a stevedore, to load the vessel upon condition that he and his hands should not communicate with Doboy or any other place ashore, and that when the vessel finished loading that said men should report to Dr. White at the national quarantine and serve out a term of

Hamilton

Surgeon General
Hospital Service.

Isakstendrum

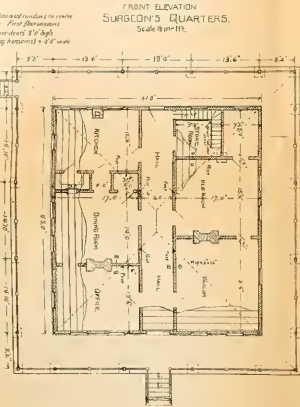
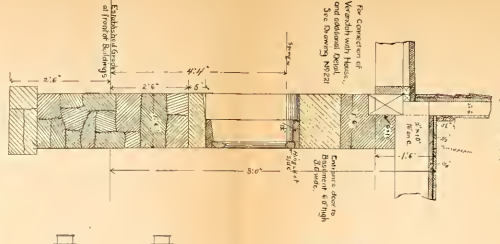
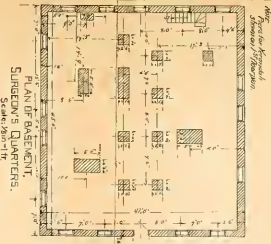
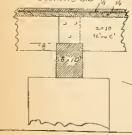
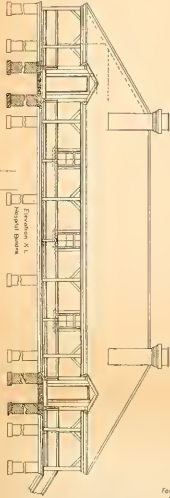
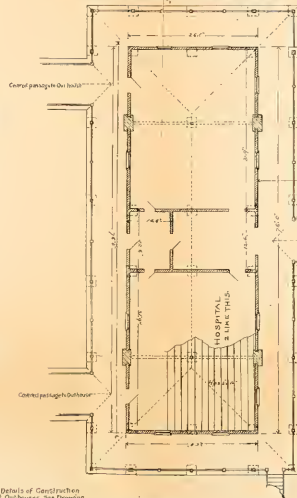
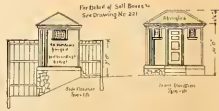
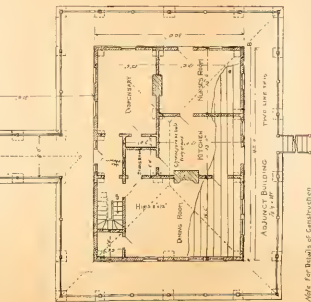
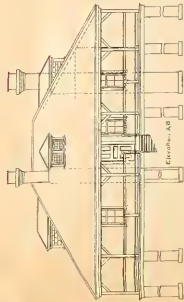
Supervising Architect.

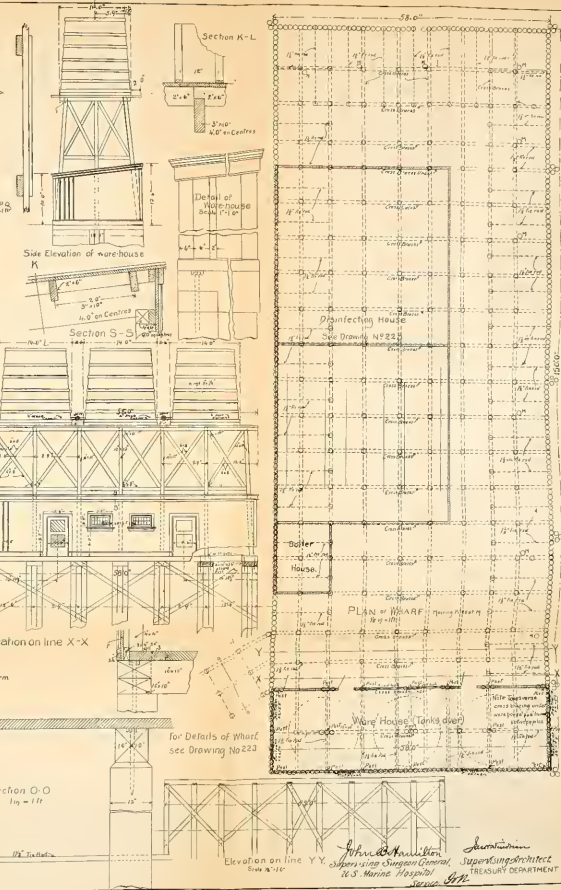
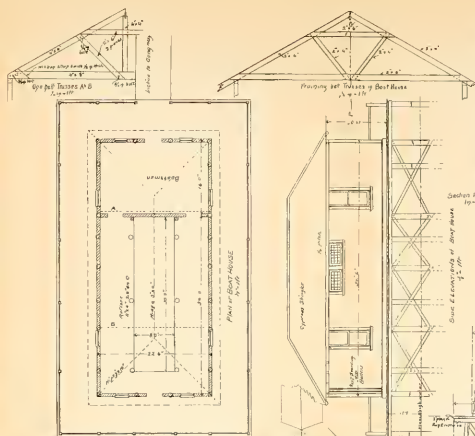
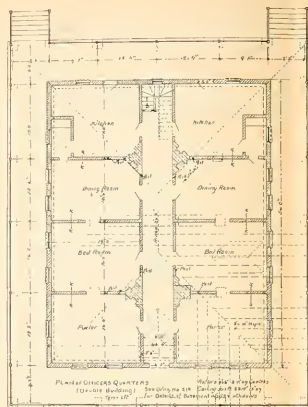
TREASURY DEPARTMENT.

C. M.

a. g. d.

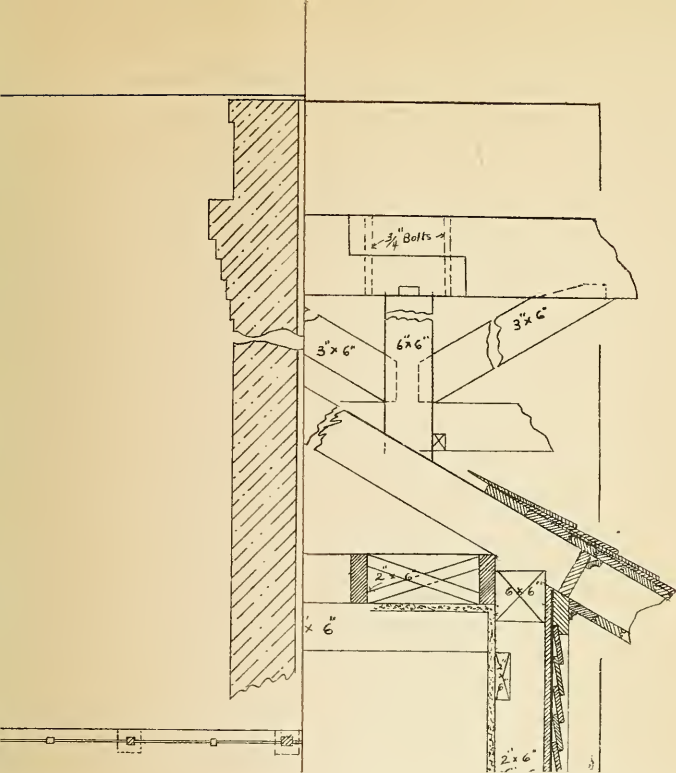
U.S. QUARANTINE STATION,

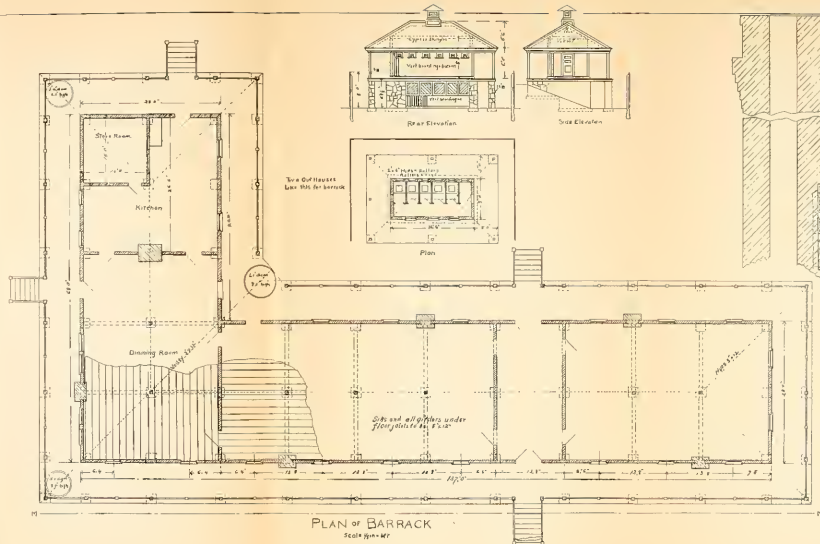




U. S. QUARANTINE STATION,
ANGEL ISLAND.
San Francisco, Cal.
Miscellaneous Drawing No 221.

2000





U.S. QUARANTINE STATION.
ANGEL ISLAND.
San Francisco, Cal.
Miscellaneous Drawing No. 220. *A. J. T.*

Elevation 1949

Section Third Chimney
1/4" = 1'-0"

John B. Hamilton
Superintending Surgeon General,
U. S. Marine Hospital Service.

J. Hamilton
Superintending Architect,
TREASURY DEPARTMENT.

seven days quarantine before coming ashore. This permit was sanctioned and its terms enjoined upon Malcolm by Dr. White, Marine-Hospital surgeon in charge of the national quarantine station.

Notwithstanding this, however, as soon as Malcolm got the ship loaded he deliberately disregarded the terms of the permit and went ashore.

So far as I can see, nothing can be done with Malcolm under the Federal laws.

A careful examination of the statutes bearing upon this subject will show that there are only two offenses under the national quarantine laws for which a penalty is prescribed, viz:

(1) For any person who shall trespass upon the grounds belonging to any quarantine station.

(2) For any master, pilot, or other person in command of a vessel coming from any foreign port or country where contagious or infectious disease may exist, or having such disease on board, who shall enter any port of the United States contrary to the quarantine laws of the State in which such port is situated. (See Act August 1, 1888, 25 Stat. L., 355, and Act April 29, 1878, 20 Stat. L., 37.)

So far as any punishment is concerned there is nothing to prevent any of the crew or passengers of a vessel detained at a national quarantine station from leaving the vessel and going ashore at any time. Nor is there any punishment prescribed for any violation of regulations which the Surgeon-General or those acting under him may make in regard to the detention or behavior of persons from ashore who may be allowed, from necessity or otherwise, to visit such vessel.

Nor does it appear that the matter can be helped by regulations. Because the only regulations of the Surgeon-General, a violation of which will subject the transgressor to a penalty, are those prescribing the manner in which a vessel infected or from an infected country may enter a port; and even in that case the penalty is limited in its application by the act of August 1, 1888, to the person in command of such vessel entering.

If, therefore, it be desirable that the fear of punishment should be invoked to maintain the quarantine regulations inviolate, and prevent an unrestrained communication between vessels detained at national quarantine stations and the shore, it will be necessary to have some additional legislation.

I inclose you a draught of a bill which would cover the ground.

I regret very much that the defects in the present quarantine laws make it impossible for me to render you any assistance in the case reported.

I have the honor to be, very respectfully,

MARION ERWIN,
United States Attorney.

The SURGEON-GENERAL,
Marine-Hospital Service, Washington, D. C.

PROPOSED LAW.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That no passenger, member of the crew, or other person, of any vessel which may be detained at a national quarantine station, under the provisions of the quarantine laws of the United States, shall leave such vessel while so detained for the purpose of going ashore unless permission be first obtained from the quarantine officer in charge of such station; and no person shall visit such vessel while so detained without first obtaining from the quarantine officer in charge written permission to make such visit; and no person after receiving such permission shall violate the terms and conditions therein contained upon which the same may be granted, for the detention of such person in quarantine for a limited period after such visit, or other restriction which such officer may in his discretion impose. Any person who shall violate any of the provisions of this act shall, upon conviction, be punished by a fine of not more than \$300, or by imprisonment not more than thirty days, or both, in the discretion of the court.

It is to be regretted that the full estimate for the maintenance of these quarantines was not agreed to by Congress. At this date the threat of cholera from the East, made it necessary to request the authority of the President to use so much of the epidemic fund as might be necessary, not exceeding \$30,000, for the purpose of keeping open the quarantines during the remainder of the fiscal year.

POST EPIDEMIC DISINFECTION.

In the history of this country no such active measures of disinfection have ever been carried on as were conducted at Jacksonville and the towns in Florida subsequent to the disappearance of the fever. It may be fairly claimed that to the destruction of the yellow fever fomites is largely due the immunity enjoyed by that State during the present year. (At Decatur, Ala., the enterprising citizens themselves performed the required disinfection and destroyed the bedding suspected of being infected, and fumigated the houses. The lower temperature, however, was an additional guaranty of safety.) Dr. Joseph Y. Porter, of the Army, had charge of the entire matter of disinfection, acting under the following general instructions:

OCTOBER 6, 1888.

SIR: Referring to telegraphic correspondence relative to the fumigation and disinfection of houses and their contents in Jacksonville, I have to say that at the proper time you will be authorized to establish a public disinfection house in the city of Jacksonville. This house shall be built on a certain definite plan, and I will prepare such plans and send them to you, in order that the building may be built under your superintendence and be ready for the cessation of the epidemic, when all clothing that can be plunged in boiling water and dried should be so treated. Mattresses, pillows, etc., should be destroyed by fire, as I do not believe any amount of boiling or disinfection will render them safe. In the matter of blankets, boiling can be easily applied, after which they can be treated by the baking process in iron pans in the house which will be built for that purpose. This I am satisfied is the only means for the prevention of the disease in addition to the closing up of houses where privies are used instead of water-closets.

Please inform me by return mail whether or not any system of sewerage exists in Jacksonville; and if so, and you can obtain from the city engineer's office a copy of the plans, I should be very glad to receive it.

I give you this advance information for your guidance in replying to inquiries that may be made to you to enlist from you such suggestions as you may have to make in the premises.

Respectfully, yours,

JOHN B. HAMILTON,

Supervising Surgeon-General Marine Hospital Service.

DR. JOSEPH Y. PORTER,

Surgeon in charge Government Relief Measures, Jacksonville, Fla.

[Telegram.]

OCTOBER 23, 1888.

DR. JOSEPH Y. PORTER,

Surgeon in charge of Government Relief Measures, Jacksonville, Fla.:

Your authority to keep refugees out of the city must come from the city council. With such authority, you need nothing further from the Government.

In regard to disinfection of bedding, Government only proposes to pay for destruction of mattresses, pillows, and comforts destroyed in the houses of the poor. Per-

sons able must sustain their own loss. City council should pass ordinance enacting penalty for concealment of infected articles in houses. The use of the public laundry, when constructed, will be free. Carpets need not be destroyed, but should be subjected to steam process.

HAMILTON,
Surgeon-General.

NOVEMBER 17, 1888.

SIR: You will inform the city council, through the acting mayor, Mr. Geroin, that the passage of an ordinance in the form inclosed will be satisfactory to the Government, and articles actually necessary to be destroyed will be paid for. All articles of clothing and bedding that can be disinfected by being plunged into a disinfecting solution and afterwards plunged in boiling water could be so treated. For this purpose a laundry-house should be immediately constructed, or, if in your judgment it can better be done, the laundry already in operation will be rented. But nothing will be done in this matter until the ordinance shall have been passed, as without it it is useless to undertake the work.

Respectfully, yours,

JOHN B. HAMILTON,
Supervising Surgeon-General Marine Hospital Service.

Surgeon JOSEPH Y. PORTER,
In charge Government Relief Measures, Jacksonville, Fla.

Whereas article 3 of section 4 of the Act of May 3, 1887, authorizes the city council to make regulations to secure the general health of the inhabitants, and to prevent and remove nuisances and for other purposes: *Therefore be it ordained* by the city council of the city of Jacksonville that, in order to secure the general health of the inhabitants of this city, that it shall be unlawful for any person to refuse to give up, to conceal, or to remove, any article in any house owned or occupied by such inhabitant which shall be declared to be infected by yellow fever by the board of health of the county of Duval, the city physician, or by any officer of the United States Government co-operating with the said boards of health, or with the city council of this city; that within ten days from the date of this ordinance, or as soon thereafter as may be practicable, every householder having in his possession any article believed to be, or declared to be, infected shall forthwith report the same to the officer of the United States Government designated as having charge of Government relief measures in this city, and in case any such article is directed to be destroyed by fire the said article or articles shall be appraised by such board of appraisers as shall be agreed upon between the city council and the officer representing the United States, and payment for the same to be guaranteed by the Government of the United States.

All bedding and pillows and bed-clothing and other articles which shall be declared by the health authorities to be infected and liable to communicate disease, are hereby declared to be nuisances, and the city authorities are hereby authorized to seize and condemn the same to be either disinfected or destroyed, and the possession of such articles after they are declared to be infected shall be a misdemeanor, and on conviction thereof the person or persons in possession shall be fined not exceeding \$100 or imprisoned not exceeding thirty days. The articles so seized or surrendered or so condemned will be paid for by the United States under regulations to be published by the Surgeon-General Marine-Hospital Service.

Any person concealing articles suspected or known to be infected, or violating any other clause of this act, shall, upon conviction thereof before any municipal court, forfeit and pay into the city treasury the sum of \$100 or suffer imprisonment for a period not exceeding thirty days, or both, at the discretion of the court.

It is further declared to be unlawful for any person to carry through the streets of

said city, or cause to be removed from house to house, any infected article without having a permit for such removal from the county or city board of health or medical officer in charge of Government relief measures. In houses where yellow fever has appeared at any time within a period of six months articles therein requiring to be disinfected shall be turned over to the officers in charge of the Government disinfecting establishment or his representative and shall be disinfected, and will be returned to the householder.

NOVEMBER 20, 1888.

SIR: Concerning the letter written yesterday, which was dictated after the close of office hours and hurried to catch the mail, I omitted to specify the articles that, in my judgment, should be destroyed. My opinion is that the class of articles that need necessarily be destroyed is an extremely limited one. Mattresses and their contents, pillows, and comforts can not well be disinfected, at least without the employment of a process so expensive as to render it useless from an economic point of view. With these exceptions I think all the articles in sick rooms can be properly disinfected. Bed-chamber walls should be sponged and washed with a solution of bichloride of mercury, and such articles as sheets, pillow-cases, and blankets should be first plunged in a disinfecting solution and afterwards put in boiling water. Wearing apparel hanging in closets adjacent to bed-chambers, carpets of bed-chambers, and rugs in bed-chambers should be subjected to disinfection by steaming. All houses should be exposed to air currents as much as possible. Upholstered furniture should be treated by spraying with bichloride of mercury solution. Please notify me by telegraph when the city council passes the ordinance inclosed in yesterday's letter.

Respectfully, yours,

JOHN B. HAMILTON,

Supervising Surgeon-General, Marine Hospital Service.

Dr. JOSEPH Y. PORTER,

Surgeon in charge Government Relief Measures, Jacksonville, Fla.

The city of Jacksonville was divided into districts, a register of the houses where yellow fever had prevailed was obtained, and a corps of men employed in removing mattresses, pillows, and other material presumably infected. The mattresses were destroyed by fire, the blankets, sheets, pillow-cases, and the like were sent to a public laundry established for the occasion, and there subjected to boiling water. The mattresses and pillows were replaced by new ones furnished by the Government or paid for at the option of the parties interested, the value of the same being determined by a board of appraisement appointed by the Jacksonville Auxiliary Sanitary Association. All bills for this service were paid by the Sanitary Association and the association reimbursed by this bureau on vouchers certified by Dr. Porter. At the same time the houses were fumigated with burning sulphur; upholstered furniture sprayed with a solution of bichloride of mercury, and carpets sent to the public laundry to be treated by steam. The successful carrying out of this work is due to the executive ability of Assistant-Surgeon Porter and the faithful work of his officers and employés.

MARINE HOSPITALS.

The several hospitals have received the usual care of the staff, and are in excellent condition with a few exceptions to be hereafter noted.

The same need exists for the erection of a hospital for incurables and for those superannuated or disabled by long service, as has been heretofore noted in former reports. The following letter gives in detail the needs of a special class of patients on the Pacific coast. The charity of the nation should be circumscribed only by the necessities of those requiring it.

U. S. MARINE-HOSPITAL SERVICE,

DISTRICT OF THE PACIFIC,

Port of San Francisco, Cal., Surgeon's Office, July 11, 1889.

SIR: Respectfully referring to my letter of July 8, 1889, requesting extension of permit of patients in hospital over ninety days, I invite your special attention to the fact that such extension is asked for no less than twenty chronics, one of whom has been in hospital over four years; two over two years; one over one year; eight from five to ten months; and seven upwards of four months, while there have been admitted during the fiscal year just ended eighty-six cases of phthisis and tubercle, of whom twenty-one died.

There is probably no city on the Pacific coast whose climate is so detrimental to the health of persons suffering with pulmonary affections as is that of San Francisco; and as there is no other available hospital near by, these cases come to this station for treatment, where they rapidly grow worse and sooner or later die, if not prevailed upon to seek a more salubrious climate.

As it is the intention of the department to provide a quarantine station at or near San Diego, I have the honor to suggest that a marine hospital be also erected on the reservation or grounds selected for quarantine purposes, where cases of pulmonary disease may be cared for. My predecessor, Surgeon Sawtelle, in his letter of inspection dated September 8, 1888, referring to San Diego, says:

"The geographical position of San Diego naturally places it among the prominent ports on this coast, and its rapid growth during the last few years warrants the belief that it is destined at no distant date to become an important commercial point, especially for trade with Mexico, and also with Central and South America.

"The necessities of the service increase, of course, in proportion to the increase of commerce, and to meet the increasing demands at this station a small hospital is now required. I therefore recommend that the port of San Diego be designated as a relief station of the first class as soon as practicable."

It is pitiable to see men suffering with incipient phthisis enter the hospital at this port, where certain death awaits them if they remain, when it is practicable to care for them in a climate where it is claimed, and has been demonstrated (see the Journal of the American Medical Association, pages 897, 898, of June 22, 1889), that the progress of this disease can be arrested, if not cures effected.

Aside from the advantage to those suffering with phthisis, the wards of the hospital at this port would be relieved of incurables, and thus give room in the wards for the proper care and treatment of acute diseases and injuries.

Very respectfully,

PRESTON H. BAILHACHE,

Surgeon, U. S. Marine-Hospital Service.

The SURGEON-GENERAL,

U. S. Marine-Hospital Service, Washington, D. C.

Hospital at Baltimore, Md.—This hospital, recently constructed, is one of the best in the Service. It, however, requires painting and some interior repairs.

Hospital at Boston, Mass.—The new boiler-house mentioned in the last report as in course of construction has been completed, and the

heating apparatus has been repaired. This hospital needs outside and inside painting and certain new floors. The stable is in very bad repair, and should be replaced by a new one.

Hospital at Cairo, Ill.—The hospital buildings at this station are in good condition, minor repairs only having been made during the year.

Hospital at Chicago, Ill.—This building is in excellent order. The approaches that were provided for in the last appropriation act are in process of construction under the Supervising Architect. The money appropriated was not sufficient to complete the breakwater and finish the approaches. The breakwater should be completed as soon as practicable.

Hospital at Cincinnati, Ohio.—This hospital is in good condition, and minor repairs only have been made. A new dead-house has been constructed, and certain alterations in the executive buildings have been made.

Hospital at Detroit, Mich.—This building is in good condition at present, but, as heretofore reported, the hospital accommodations are entirely inadequate for the requirements of the Service. An additional building should be constructed for quarters of medical officer, which would allow the use of rooms now used as quarters for wards. One of the corridors on the second story has been boarded in, to make additional ward space.

Hospital at Evansville, Ind.—The act of Congress establishing the marine hospital at Evansville was followed by the appointment of a board to select a site, but much opposition was made by residents of the city to the site selected by that board. In February last I visited Evansville and recommended a new site, which recommendation being adopted by the Secretary, no opposition has since been manifested. The Attorney-General was immediately asked to examine the title by the Secretary of the Treasury, and the Supervising Architect now has the plans under consideration.

Hospital at Key West, Fla.—Repairs of a minor character only have been made during the year. The hospital is reported in good condition.

Hospital at Louisville, Ky.—This hospital is in fair condition, but is ill ventilated, and outside quarters for the medical officer should be constructed, for the same reasons as those urged at Detroit.

Hospital at Memphis, Tenn.—These buildings are in good order, but the condition of the grounds remain the same as at last report.

Hospital at Mobile, Ala.—This hospital is in excellent condition. New floors have been constructed in two of the wards, and extensive repairs have been made to the basement. Some of the fences need repainting.

Hospital at New Orleans, La.—This hospital is in fair condition. A brick wall has been built around the entire reservation and sidewalks constructed, but the interior approaches are in bad order, and additional

accommodations should be built. The following letter shows the needs of this station in detail :

U. S. MARINE HOSPITAL SERVICE,
DISTRICT OF THE GULF,

Port of New Orleans, La., Surgeon's Office, June 20, 1889.

SIR: I would respectfully call your attention to the lack of accommodations at this port for sick sailors. During the five autumn and winter months the two wards were overcrowded the entire time, and many times admission had to be refused on account of lack of room.

Several times there were over forty patients in the colored ward, and the overcrowding caused all the cases to do badly, and erysipelas, etc., attacked surgical cases.

With only two wards all classes of cases have to be kept together, and there is no place for isolating a case of suspicious character. There should be at least one more ward (capable of holding thirty or more patients), or, what I should greatly prefer, two or three small wards, so that the cases could be separated and isolated, if necessary.

There is great need also of a steam-laundry building and fixtures.

The present method of lighting the building is expensive, dirty, and unsatisfactory in every way, and I would again respectfully urge that the electric light (for which bids were received, etc., last year) be introduced. The cost of the electric light was very little—\$23 for plant and one hundred and fifty-nine lights of 16-candle power, etc.—and the cost of running the light during the year would be less than the cost of gasoline, etc.

I would also state the danger the buildings are in from lack of water in case of fire. There is plenty of hose ($1\frac{1}{4}$ inches), etc., but the pressure from the cistern is not sufficient to throw the water 10 feet. Unless the fire happened to be burning in the furnace at the time of a fire breaking out among the buildings, it would take twenty minutes to start the pump.

There should be a separate system of water supply for fire purposes—a cistern capable of holding 10,000 gallons, elevated at least 35 feet above ground, and from it a circuit of 3 or 4 inch iron pipe, to which the hose could be connected. All the buildings are suffering terribly for want of paint exteriorly.

New cisterns for the officers' quarters are much needed.

The batture in front of the hospital should be inclosed on the sides below water-mark to keep cattle, etc., out.

The brick wall recently erected would be benefited by a wash of cement, and the brick pavement recently put down should be taken up and laid in cement, as it is already covered with grass, which it is impossible to keep out or down.

The grounds are sadly in need of repair, should be laid out, drained, and walks, etc., made.

Very respectfully,

CHAS. B. GOLDSBOROUGH,
Surgeon, Marine-Hospital Service, Custodian.

The SURGEON-GENERAL MARINE HOSPITAL SERVICE,
Washington, D. C.

Hospital at Portland, Me.—This hospital is in good condition with the exception of the roof, which should be replaced by a new one.

Hospital at Port Townsend, Wash.—A new ward should be constructed at this port in place of the one at present occupied. The buildings are generally in good order.

Hospital at St. Louis, Mo.—The buildings are in excellent order, with

the exception of the old building formerly used as a hospital, and only minor repairs have been made.

Hospital at San Francisco, Cal.—Considerable alterations are required at this station. The wind-pump supplying water for general purposes for the hospital has been repaired.

Hospital at Vineyard Haven, Mass.—Repairs of a minor character only have been made during the year. It is too small for the growing necessities of the port and should be enlarged by a separate building for officers' quarters.

Hospital at Wilmington, N. C.—Minor repairs only have been made at this hospital. The entire reservation, which is quite a large one, should be fenced and the grounds put in slightly condition. Additional ward space is necessary, and the construction of officers' quarters is again recommended.

HOSPITALS NEEDED.

In the opinion of this Bureau marine hospitals are needed at New York, Philadelphia, Norfolk, and San Diego.

RELIEF FURNISHED.

During the fiscal year relief was furnished 49,518 patients, of whom 13,729 were treated in hospital and 35,789 treated as out-patients. This shows an increase of 4,204 as compared with the previous year.

CONTRACTS FOR THE CARE OF SEAMEN.

The following contracts have been made for the ensuing fiscal year:

[Circular.]

1889. Department No. 53.]

TREASURY DEPARTMENT,
OFFICE SUPERVISING SURGEON-GENERAL
U. S. MARINE-HOSPITAL SERVICE,
Washington, D. C., June 15, 1889.

The following contracts for the care of seamen entitled to relief from this Service, for the fiscal year ending June 30, 1890, are published for the information of accounting officers of the Treasury Department, disbursing agents, medical officers of the Marine-Hospital Service, acting assistant surgeons, and customs officers. This circular is to be regarded as official notification of the acceptance of the proposals made by the parties designated, and must be cited, giving its number and date, on all bills for the treatment and maintenance of seamen, and for the burial of deceased patients, as the authority for any expenditure incurred under its provisions. Charges will be allowed only for actual time in hospital. The right is reserved by the Secretary of the Treasury to terminate any contract whenever the interests of the Service require it. All relief must be furnished in accordance with the revised regulations approved 1889, and subsequent circulars.

JOHN B. HAMILTON,
Supervising Surgeon-General U. S. Marine-Hospital Service.

Approved:

GEO. S. BATCHELLER,
Acting Secretary of the Treasury.

Albany, N. Y.—The medical attendance to be furnished by an acting assistant surgeon; the Albany Hospital to furnish quarters, subsistence, nursing, and medicines, at \$1 per day.

Alexandria, Va.—The medical attendance to be furnished by an acting assistant surgeon. Allowances will be made, when necessary, to furnish quarters, subsistence, nursing, and medicines, at 90 cents per day.

Apalachicola, Fla.—Dr. J. D. Rush to furnish medical attendance and medicines, at \$45 per month; Martha Campbell to furnish quarters, subsistence, and nursing, at \$1 per day, and to provide for the burial of deceased patients, at \$12.50 each.

Ashtabula, Ohio.—The medical attendance to be furnished by an acting assistant surgeon; Mrs. Henry Whelpley to furnish quarters, subsistence, and nursing, at \$1 per day; contagious diseases, \$1.50 per day; Sanders & Clover to provide for the burial of deceased patients, at \$15 each. Patients requiring long-continued hospital treatment will be furnished transportation to Cleveland, Ohio.

Astoria, Oregon.—St. Mary's Hospital to furnish quarters, subsistence, nursing, medical attendance, and medicines, at \$1 per day.

Baltimore, Md.—Hospital patients to be cared for in the United States Marine Hospital; George Rinehart to provide for the burial of deceased patients, at \$17 each.

Bangor, Me.—The medical attendance to be furnished by an acting assistant surgeon; Kanaley & Shine to furnish quarters, subsistence, and nursing, at \$1 per day; Abel Hunt to provide for burial of deceased patients, at \$10 each.

Barnstable, Mass., and suburbs.—Medical attendance and medicines for out-patients at Dennis to be furnished by Dr. H. S. Kelley, jr., at \$37.50 per month; at Hyannis, by Dr. G. W. Kelly, at \$20 per month. At Barnstable, Chatham, Orleans, Provincetown, and Wellfleet, allowances will be made, as specified in paragraph 182 of the revised regulations, approved 1889.

Bath, Me.—The medical attendance to be furnished by an acting assistant surgeon; William J. Howard to furnish quarters, subsistence, and nursing, at \$1 per day; John M. Clark to provide for the burial of deceased patients, at \$14 each. Patients requiring long-continued hospital treatment will be furnished transportation to the United States Marine Hospital at Portland, Me.

Belfast, Me.—The medical attendance to be furnished by an acting assistant surgeon; Horace C. Webber to furnish quarters, subsistence, and nursing, at \$1.25 per day.

Bismarck, Dak.—The medical attendance to be furnished by an acting assistant surgeon; quarters, subsistence, and nursing to be furnished by Sister Regina Otto, at 90 cents per day; contagious diseases, at \$2 per day.

Boston, Mass.—Hospital patients to be cared for in the United States Marine Hospital at Chelsea, Mass.; burial of deceased patients at the hospital cemetery; burial of foreign patients, at \$10 each.

Bridgeport, Conn.—Bridgeport Hospital to furnish quarters, subsistence, nursing, medical attendance, and medicines, at \$1 per day; the board of public charities to provide in like manner for small-pox patients, at \$20 per week; Hawley, Wilmot & Reynolds to provide for the burial of deceased patients, at \$16 each.

Brownsville, Tex.—The medical attendance to be furnished by an acting assistant surgeon.

Brunswick, Ga.—The medical attendance to be furnished by an acting assistant surgeon; Thomas Foley to furnish quarters, subsistence, and nursing, at 90 cents per day; Charles G. Moore to provide for the burial of deceased patients, at \$20 each.

Buffalo, N. Y.—The medical attendance to be furnished by a medical officer of the Marine-Hospital Service; the Buffalo Hospital (Sisters of Charity) to furnish quarters, subsistence, nursing, and medicines, at 75 cents per day; contagious diseases, at \$3 per day; and to provide for the burial of deceased patients, at \$7.50 each.

Burlington, Iowa.—The St. Francis Hospital to furnish quarters, subsistence, medical attendance, nursing, and medicines, at 90 cents per day.

Burlington, Vt.—The "Mary Fletcher Hospital" to furnish quarters, subsistence, nursing, medical attendance, and medicines, at \$1 per day.

Cairo, Ill.—Hospital patients to be cared for in the United States Marine Hospital; L. E. Falconer to provide for the burial of deceased patients, at \$15 each; W. C. Newsum to furnish ambulance transportation, at rates of \$1.50 for day service and \$2 for night service.

Cedar Keys, Fla.—R. T. Walker, M. D., to furnish medical attendance and medicines for both hospital and out-patients, at \$25 per month; John H. Sutton to furnish quarters, subsistence, and nursing, at \$1.50 per day.

Charleston, S. C.—The medical attendance to be furnished by a medical officer of the Marine Hospital Service; out-patients to be treated at the dispensary (Atlantic Wharf); the City Hospital to furnish quarters, subsistence, nursing, and medicines, at 83 cents per day; contagious diseases, \$1.50 per day; and to provide for the burial of deceased patients, at \$10 each. Seamen requiring long-continued hospital treatment will be furnished transportation to the United States Marine Hospital at Wilmington, N. C.

Chattanooga, Tenn.—The medical attendance to be furnished by an acting assistant surgeon; W. T. Walker, chairman county hospital, to furnish quarters, subsistence, nursing, and medicines, at 65 cents per day; contagious diseases, at \$1.50 per day; Swetnam & Scott to provide for the burial of deceased patients, at \$10 each.

Chicago, Ill.—Hospital patients to be cared for in the United States Marine Hospital; H. Bartlett to provide for the burial of deceased patients, at \$20 each.

Cincinnati, Ohio.—Hospital patients to be cared for in the United States Marine Hospital; dispensary at the hospital, southeast corner Third and Kilgour streets; P. Gilligan to provide for the burial of deceased patients, at \$13.75 each.

Cleveland, Ohio.—The medical attendance to be furnished by a medical officer of the Marine Hospital service; the "Cleveland City Hospital Association" to furnish quarters, subsistence, nursing, and medicines in the United States Marine Hospital, under lease of September 21, 1875, at 64 cents per day. The hospital to be kept in repair by the association; Hogan & Harris to provide for the burial of deceased patients, at \$10 each.

Corpus Christi, Tex.—The medical attendance to be furnished by an acting assistant surgeon; James E. Ellis to furnish quarters, subsistence, and nursing, at \$1.40 per day.

Crisfield, Md.—The medical attendance to be furnished by an acting assistant surgeon; Stewart Handy to furnish quarters, subsistence, and nursing, at 55 cents per day. Patients requiring long-continued hospital treatment will be furnished transportation to Baltimore, Md.

Detroit, Mich.—Hospital patients to be cared for in the United States Marine Hospital; out-patients to be treated at the dispensary, No. 90 Griswold street; J. Dick & Son to provide for the burial of deceased patients, at \$3 each.

Dubuque, Iowa.—The medical attendance to be furnished by an acting assistant surgeon; St. Joseph's Mercy Hospital to furnish quarters, subsistence, nursing, and medicines, at \$1 per day.

Duluth, Minn.—The medical attendance to be furnished by an acting assistant surgeon; St. Luke's Hospital to furnish quarters, subsistence, nursing, and medicines, at 87½ cents per day; E. E. Randall & Co. to provide for the burial of deceased patients, at \$14.50 each.

Eastport, Me.—Hospital or other relief to be furnished under the provisions of the regulations of the Marine Hospital Service, as to third-class stations.

East Saginaw, Mich.—The medical attendance to be furnished by an acting assistant surgeon. Saginaw Hospital, to furnish quarters, subsistence, nursing, and medicines, at 90 cents per day. Patients requiring long-continued hospital treatment to be furnished transportation to the United States Marine Hospital at Detroit, Mich.

Edenton, N. C.—R. Dillard, M. D., to furnish quarters, subsistence, nursing, medical

attendance, and medicines, at \$2 per day. Patients requiring long-continued hospital treatment will be furnished transportation to the United States Marine Hospital at Wilmington, N. C. For out-patients, \$1 will be allowed for each prescription and 25 cents for each time medicine is furnished.

Edgartown, Mass.—Hospital patients to be cared for in the United States Marine Hospital at Vineyard Haven.

Elizabeth City, N. C.—The medical attendance to be furnished by an acting assistant surgeon.

Ellsworth, Me.—The medical attendance to be furnished by an acting assistant surgeon. Hospital care and treatment will be furnished only to patients who are unable to bear transportation to the United States Marine Hospital at Portland, Me.

Empire City, Oregon.—J. T. McCormac, M. D., to furnish quarters, subsistence, nursing, medical attendance, and medicines, at \$2 per day; contagious diseases, at \$3 per day; and to provide for the burial of deceased patients, at \$15 each.

Erie, Pa.—The medical attendance to be furnished by an acting assistant surgeon; Hamot Hospital Association to furnish quarters, subsistence, and nursing, at 71 cents per day. Patients requiring long-continued hospital treatment will be furnished transportation to the United States Marine Hospital at Detroit, Mich.

Escanaba, Mich.—The medical attendance to be furnished by an acting assistant surgeon; Delta County Hospital to furnish quarters, subsistence, and nursing, at \$1 per day; D. A. Oliver to provide for the burial of deceased patients, at \$15 each.

Eureka, Cal.—The medical attendance to be furnished by an acting assistant surgeon; James Gill to furnish quarters, subsistence, nursing, and medicines, at \$1.25 per day; contagious diseases, at \$3 per day; and to provide for the burial of deceased patients, at \$20 each.

Evansville, Ind.—The medical attendance to be furnished by a medical officer of the Marine Hospital Service; the Evansville City Hospital Association to furnish quarters, subsistence, nursing, and medicines, at 75 cents per day; Joseph Schaefer to provide for the burial of deceased patients, at \$10 each.

Fairport Harbor, Ohio.—The medical attendance to be furnished by an acting assistant surgeon. Patients requiring hospital care and treatment to be furnished transportation to the hospital at Cleveland, Ohio.

Fernandina, Fla.—The medical attendance to be furnished by an acting assistant surgeon; W. B. Smith to furnish quarters, subsistence, and nursing, at \$1 per day; and to provide for the burial of deceased patients, at \$16 each.

Fredericksburgh, Va.—The medical attendance to be furnished by an acting assistant surgeon; Mary G. Herndon to furnish quarters, subsistence, nursing, and medicines, at \$1 per day.

Gallipolis, Ohio.—The medical attendance to be furnished by an acting assistant surgeon; Mrs. Genevieve Maxon to furnish quarters, subsistence, and nursing, at \$1.40 per day; C. Skees & Co. to provide for the burial of deceased seamen, at \$14 each.

Galveston, Tex.—The medical attendance to be furnished by a medical officer of the Marine Hospital Service; Sister Augustine, superior, to furnish quarters, subsistence, nursing, and medicines, at \$1 per day; contagious diseases, at \$2 per day; and to provide for the burial of deceased patients, at \$7 each. Patients requiring long-continued hospital treatment will be furnished transportation to the United States Marine Hospital at New Orleans, at the discretion of the medical officer.

Georgetown, D. C.—The medical attendance to be furnished by a medical officer of the Marine Hospital Service; out-patients to be treated at the dispensary, 1306 F street, northwest, Washington; Providence Hospital, Washington, to furnish quarters, subsistence, nursing, and medicines, at 75 cents per day.

Georgetown, S. C.—The medical attendance to be furnished by an acting assistant surgeon; M. S. Mustard and Susan Dennison to furnish quarters, subsistence, and nursing, at \$1.50 per day.

Gloucester, Mass.—The medical attendance to be furnished by an acting assistant

surgeon. Patients requiring hospital care and treatment to be furnished transportation to the United States Marine Hospital at Chelsea, Mass.

Grand Haven, Mich.—The medical attendance to be furnished by an acting assistant surgeon; Nancy Palmer to furnish quarters, subsistence, and nursing, at \$1 per day.

Green Bay, Wis.—The medical attendance to be furnished by an acting assistant surgeon; St. Vincent's Hospital to furnish quarters, subsistence, nursing, and medicines, at \$1 per day; contagious diseases, at \$3 per day; Lefebvre & Schumacher to provide for the burial of deceased patients, at \$18 each.

Hartford, Conn.—The Hartford Hospital to furnish quarters, subsistence, nursing, medical attendance, and medicines, at \$1 per day; G. W. Wooley & Son to provide for the burial of deceased patients, at \$13 each.

Jacksonville, Fla.—The medical attendance to be furnished by an acting assistant surgeon; M. M. Gaines to furnish quarters, subsistence, and nursing, at \$1 per day; contagious diseases, at \$2 per day; and to provide for the burial of deceased patients, at \$10 each.

Key West, Fla.—Hospital patients to be cared for in the United States Marine Hospital; Williams & Warren to provide for the burial of deceased patients, at \$15 each.

La Crosse, Wis.—The medical attendance to be furnished by an acting assistant surgeon; St. Francis Hospital, M. Ludovica, superior, to furnish quarters, subsistence, nursing, and medicines, at \$1 per day; contagious diseases, at \$2 per day; Walter Tillman to provide for the burial of deceased patients, at \$15 each.

Little Rock, Ark.—The medical attendance to be furnished by an acting assistant surgeon; Little Rock Infirmary to furnish quarters, subsistence, nursing, and medicines, at \$1 per day; F. Baer to provide for the burial of deceased patients, at \$3 each.

Louisville, Ky.—Hospital patients to be cared for in the United States Marine Hospital; out-patients to be treated at the dispensary, 915 Jefferson street; Wyatt & Cralle to provide for the burial of deceased patients, at \$17 each.

Ludington, Mich.—The medical attendance to be furnished by an acting assistant surgeon; Ellen Yocky to furnish quarters, subsistence, and nursing, at \$1 per day.

Machias, Me.—The medical attendance to be furnished by an acting assistant surgeon; Abial E. Proble to furnish quarters, subsistence, and nursing at 85½ cents per day; E. M. Bucknam & Co. to provide for the burial of deceased patients, at \$10 each.

Manistee, Mich.—The medical attendance to be furnished by an acting assistant surgeon. Allowances will be made, when necessary, to furnish quarters, subsistence, and nursing, at \$1 per day.

Marquette, Mich.—The medical attendance to be furnished by an acting assistant surgeon; Emergency Hospital to furnish quarters, subsistence, and nursing, at \$1 per day; contagious diseases at \$4 per day; and to provide for burial of deceased patients, at \$15 each.

Memphis, Tenn.—Hospital patients to be cared for in the United States Marine Hospital; John Walsh to provide for the burial of deceased patients, at \$10.50 each.

Millwaukee, Wis.—The medical attendance to be furnished by an acting assistant surgeon; out-patients to be treated at No. 159 Wisconsin street; St. Mary's Hospital to furnish quarters, subsistence, nursing, and medicines, at 80 cents per day; C. E. Judson to provide for the burial of deceased patients, at \$16 each. Chronic hospital patients to be furnished transportation to the United States Marine Hospital at Chicago, Ill.

Mobile, Ala.—Hospital patients to be cared for in the United States Marine Hospital; Peter F. Alba to provide for the burial of deceased patients, at \$15 each.

Nashville, Tenn.—The medical attendance to be furnished by an acting assistant surgeon. Allowances will be made, when necessary, to furnish quarters, subsistence, nursing, and medicine, at 90 cents per day; contagious diseases, at \$1.75 per day; and to provide for the burial of deceased patients, at \$6 each.

New Bedford, Mass.—The medical attendance to be furnished by an acting assistant surgeon. Patients requiring hospital care and treatment, if able to bear transportation, will be sent to the United States Marine Hospital at Vineyard Haven.

New Berne, N. C.—The medical attendance to be furnished by an acting assistant surgeon. Patients requiring long-continued hospital treatment will be furnished transportation to the United States Marine Hospital at Wilmington, N. C. For other hospital patients, Nancy Jane Watson to furnish quarters, subsistence, and nursing, at 50 cents per day; Moses T. Bryan to provide for the burial of deceased patients, at \$13 each.

New Haven, Conn.—The medical attendance to be furnished by an acting assistant surgeon; the New Haven General Hospital to furnish quarters, subsistence, nursing, and medicines, at \$1 per day; contagious diseases, at \$3 per day; and to provide for the burial of deceased patients, at \$15 each.

New London, Conn.—The medical attendance to be furnished by an acting assistant surgeon. Hospital care and treatment to be furnished at a rate not exceeding 85 cents per day, only to patients who are unable to bear transportation to the Marine Hospital at Stapleton, Staten Island, New York; Caulkins & Prentiss to provide for the burial of deceased patients, at \$12 each.

New Orleans, La.—Hospital patients to be cared for in the United States Marine Hospital; Thos. McMahon & Sons to provide for the burial of deceased patients, at \$3 each.

Newport, Ark.—The medical attendance to be furnished by an acting assistant surgeon; Puss Watkins to furnish quarters, subsistence, and nursing, at \$1.50 per day.

Newport, R. I.—The medical attendance to be furnished by an acting assistant surgeon; the Newport Hospital to furnish quarters, subsistence, nursing, and medicines, at \$1 per day; Michael Cottrell to provide for the burial of deceased patients, at \$11.50 each. Patients requiring long-continued hospital treatment will be furnished transportation to the Marine Hospital, Stapleton, Staten Island, New York.

New York, N. Y.—Hospital patients to be cared for in the Marine Hospital, Stapleton, Staten Island, New York; out-patients to be treated at the dispensary, near the "New Barge Office, Battery;" G. F. Schaefer, of Staten Island, to provide for the burial of deceased patients, at \$7 each.

Norfolk, Va.—The medical attendance to be furnished by a medical officer of the Marine-Hospital Service; Sister Isadore Kenney to furnish quarters, subsistence, nursing, ambulance service, and medicines, at 78 cents per day; J. E. Edwards to provide for the burial of deceased patients, at \$10 each.

Ogdensburg, N. Y.—Hospital or other relief to be furnished under the provisions of the Regulations of the Marine-Hospital Service, as to third-class stations.

Oswego, N. Y.—The medical attendance to be furnished by an acting assistant surgeon; the Oswego Hospital to furnish quarters, subsistence, nursing, and medicines, at \$1.25 per day.

Pensacola, Fla.—The medical attendance to be furnished by an acting assistant surgeon; R. W. Hargis to furnish quarters, subsistence, nursing, and medicines, at \$1 per day. Patients requiring long-continued hospital treatment will be furnished transportation to the United States Marine Hospital at Mobile, Ala.

Philadelphia, Pa.—The medical attendance to be furnished by a medical officer of the Marine-Hospital Service; the German Hospital to furnish quarters, subsistence nursing, medicines, and a resident physician, at 75 cents per day, and to provide for the burial of deceased white patients, at \$10 each; colored patients, at \$15 each. Transportation from the Marine-Hospital Office to the hospital to be furnished by the hospital authorities when required. Care and treatment of contagious cases to be furnished by the Philadelphia Board of Health, at \$1 per day; and to provide for the burial of such deceased patients, at \$5 each.

Pittsburgh, Pa.—The medical attendance to be furnished by a medical officer of the Marine-Hospital Service; out-patients to be treated at No. 96 Wood street; the Mercy

Hospital to furnish quarters, subsistence, nursing, and medicines, at 94 cents per day; J. J. Giltinan to provide for the burial of deceased patients, at \$13 each. Care and treatment of small-pox, yellow fever, or cholera patients, to be furnished by the Pittsburgh Board of Health, at \$2 per day.

Plymouth, Mass.—The medical attendance to be furnished by an acting assistant surgeon.

Port Huron, Mich.—The medical attendance to be furnished by an acting assistant surgeon; "Hospital and Home" to furnish quarters, subsistence, nursing, and medicines, at \$1 per day; contagious diseases, at \$2 per day. Patients requiring long-continued hospital treatment will be furnished transportation to the United States Marine Hospital at Detroit; Geo. Thompson to provide for the burial of deceased patients, at \$12 each.

Portland, Me.—Hospital patients to be cared for in the United States Marine Hospital; Ilsley Bros. to provide for the burial of deceased patients, at \$6.50 each.

Portland, Oregon.—The medical attendance to be furnished by a medical officer of the Marine-Hospital Service; out-patients to be treated at the dispensary, Room 21, "Union Block," corner of First and Stark streets; St. Vincent's Hospital to furnish quarters, subsistence, nursing, and medicines, at 80 cents per day; Horatio Cooke to provide for the burial of deceased patients, at \$16 each.

Portsmouth, N. H.—The medical attendance to be furnished by an acting assistant surgeon; Cottage Hospital to furnish quarters, subsistence, and nursing, at \$1 per day.

Port Townsend, Wash.—Hospital patients to be cared for in the United States Marine Hospital; G. M. Rouse to provide for the burial of deceased patients, at \$12 each.

Providence, R. I.—The Rhode Island Hospital to furnish quarters, subsistence, nursing, medical attendance, and medicines, at \$1 per day, and to provide for the burial of deceased patients, at \$12 each. Patients requiring long-continued hospital treatment will be furnished transportation to the United States Marine Hospital at Chelsea (Port of Boston).

Richmond, Va.—The medical attendance to be furnished by an acting assistant surgeon; out-patients to be treated at the Marine-Hospital Office, custom-house building; "Retreat for the Sick" Hospital to furnish quarters, subsistence, nursing, and medicines, at \$1 per day.

Rockland, Me.—The medical attendance to be furnished by an acting assistant surgeon; John S. Ranlett to furnish quarters, subsistence, and nursing, at \$1 per day. Patients requiring long-continued hospital treatment to be furnished transportation to the United States Marine Hospital at Portland, Me.

Rome, Ga.—The medical attendance to be furnished by an acting assistant surgeon; Mrs. Lou Echols to furnish quarters, subsistence, and nursing, at \$1 per day.

Sag Harbor, N. Y.—Dr. George A. Sterling to furnish quarters, subsistence, nursing, medical attendance, and medicines, at \$1.50 per day. Only such patients will be furnished hospital treatment at Sag Harbor as are unable to bear transportation to the Marine Hospital at Stapleton, Staten Island, New York.

St. Louis, Mo.—Hospital patients to be cared for in the United States Marine Hospital; Edward H. Scheele to provide for the burial of deceased patients, at \$10.25 each.

St. Paul, Minn.—The medical attendance to be furnished by an acting assistant surgeon; St. Joseph's Hospital to furnish quarters, subsistence, nursing, and medicines, at \$1 per day; contagious diseases, at \$2 per day; and to provide for the burial of deceased patients, at \$10 each.

Salem, Mass.—The Salem Hospital to furnish quarters, subsistence, nursing, medical attendance, and medicines, at \$2.50 per day to patients unable to bear transportation to the United States Marine Hospital at Chelsea (Port of Boston); and to provide for the burial of deceased patients, at \$15 each.

San Diego, Cal.—Dr. W. A. Winder to furnish quarters, subsistence, nursing, medical attendance, and medicines at \$1.75 per day; and to provide for the burial of deceased patients, at \$15 each.

Sandusky, Ohio.—The medical attendance to be furnished by an acting assistant surgeon; the Good Samaritan Hospital to furnish quarters, subsistence, and nursing at \$1 per day; Deck & Andres to provide for the burial of deceased patients, at \$10 each.

San Francisco, Cal.—Hospital patients to be cared for in the United States Marine Hospital; out-patients to be treated at the Marine Hospital Office, Rooms 1-3, Appraiser's building; burial of deceased patients at the hospital cemetery; burial of foreign seamen at \$10 each.

Sault Ste. Marie, Mich.—The medical attendance to be furnished by an acting assistant surgeon; James and Mary J. Walker to furnish quarters, subsistence, and nursing, at \$1.25 per day; N. V. Gabriel to provide for the burial of deceased patients, at \$15 each.

Savannah, Ga.—The medical attendance to be furnished by a medical officer of the Marine-Hospital Service; the St. Joseph's Infirmary to furnish quarters, subsistence, nursing, and medicines, at \$1 per day; John H. Fox to provide for the burial of deceased patients, at \$8.50 each. Patients requiring long-continued hospital treatment will be furnished transportation to the United States Marine Hospital at Wilmington, N. C.

Seattle, Wash.—The medical attendance to be furnished by an acting assistant surgeon; Providence Hospital to furnish quarters, subsistence, nursing, and medicines, at 86 cents per day; O. C. Shorey & Co. to provide for the burial of deceased patients, at \$15.50 each.

Shreveport, La.—The medical attendance to be furnished by an acting assistant surgeon; out-patients to be treated at the Marine-Hospital Office; T. J. & J. W. Allen to furnish quarters, subsistence, nursing, and medicines, at \$1.50 per day; W. W. Waring to provide for the burial of deceased patients, at \$14 each.

Sitka, Alaska.—The medical attendance to be furnished by an acting assistant surgeon; William Millmore to furnish quarters, subsistence, and nursing, at \$2.50 per day.

Tacoma, Wash.—The medical attendance to be furnished by an acting assistant surgeon; "Fannie C. Paddock Memorial Hospital" nursing and medicines at \$1 per day; for contagious diseases, \$1.50 per day; and to provide for the burial of diseased patients, at \$15 each.

Tappahannock, Va.—Dr. W. G. Jeffries to furnish quarters, subsistence, nursing, medical attendance, and medicines at Tappahannock; Dr. W. J. Newbill at Carter's Creek; and Dr. W. S. Christian at Urbana, each at \$1.50 per day.

Toledo, Ohio.—The medical attendance to be furnished by an acting assistant surgeon; St. Vincent Hospital to furnish quarters, subsistence, nursing, and medicines, at 80 cents per day; contagious diseases, \$2 per day; and to provide for the burial of deceased patients, at \$15 each.

Tuckerton, N. J.—The medical attendance to be furnished by an acting assistant surgeon; Mary A. Gifford to furnish quarters, subsistence, and nursing, at \$1 per day.

Vicksburg, Miss.—The medical attendance to be furnished by an acting assistant surgeon; the Vicksburg City Hospital to furnish quarters, subsistence, nursing, and medicines, at \$1 per day; contagious diseases, at \$3 per day.

Vineyard Haven, Mass.—Hospital patients to be cared for in the United States Marine Hospital; M. C. Vincent to provide for the burial of deceased patients, at \$17 each.

Waldoborough, Me.—Hospital or other relief to be furnished under the provisions of the Regulations of the Marine Hospital Service, as to third-class stations.

Wheeling, W. Va.—The medical attendance to be furnished by an acting assistant surgeon; the Wheeling Hospital to furnish quarters, subsistence, nursing, and medicines, at \$1 per day.

Wilmington, Cal.—R. W. Hill, M. D., to furnish quarters, subsistence, nursing, medical attention, and medicines, at \$1.30 per day; contagious diseases, at \$4 per day; and to provide for the burial of deceased patients, at \$13 each.

Wilmington, Del.—Willard Springer, M. D., to furnish quarters, subsistence, nursing, medical attendance, and medicines, at \$1 per day.

Wilmington, N. C.—Hospital patients to be cared for in the United States Marine Hospital; J. W. Woolvin to provide for the burial of deceased patients, at \$17 each.

Wiscasset, Me., and subports.—Hospital or other relief to be furnished under the provisions of the Regulations of the Marine Hospital Service, as to third-class stations.

NOTE.—At all ports not otherwise specified, the dispensary is located at the custom-house or marine hospital. The rate at ports not specifically provided for by this circular will, in each special case, be fixed by the department upon the recommendation of the proper officer, in accordance with the regulations approved 1889.

The rate of charge for seamen from vessels of the Navy and Coast Survey, admitted to hospital under the provisions of the regulations, and for foreign seamen admitted under the act of March 3, 1875, is hereby fixed at the uniform rate of \$1 per diem at ports where there are marine hospitals, and at contract rates at other ports.

CONCLUSION.

This report would be incomplete if it failed to record, with sincere thanks, that the clerks and employés of the Bureau, and the officers and employés of the Service generally, have performed the important duties assigned them with care and fidelity and with that zeal now customary with the attachés of this Service.

I am, sir, very respectfully, your obedient servant,

JOHN B. HAMILTON,

Supervising Surgeon-General.

Hon. WM. WINDOM,

Secretary of the Treasury.

FINANCIAL STATEMENT.

RECEIPTS AND EXPENDITURES U. S. MARINE-HOSPITAL SERVICE, FOR THE FISCAL YEAR ENDED JUNE 30, 1889.

The balance available at the commencement of the fiscal year was \$158,009.70 and the receipts from all sources were \$486,550.23, making an available total of \$644,559.93. The expenditures were \$540,134.53. This does not include the expenses for repairs and preservation of marine hospitals, fuel, lights, and water, furniture and repairs of furniture, etc., which were paid for out of special appropriations.

The balance on hand at the close of the fiscal year is \$104,425.40.

SUMMARY.

Receipts, tonnage tax collected	\$477, 047. 19
Repayments to the Marine-Hospital Service for care and treatment of foreign seamen, etc.	9, 503. 04
Total	486, 550. 23
Expenditures	540, 134. 53
Total receipts for the year.....	486, 550. 23
Amount expended from unexpended balance in the Treasury.....	53, 584. 30

Expenditures 1888-'89, preventing the spread of epidemic diseases.

Balance available July 1, 1888	159, 260. 04
Appropriation approved September 26, 1888.....	200, 000. 00
Total appropriations.....	359, 260. 04
Expenditures to June 30, 1889.....	246, 995. 60
Balance July 1, 1889	112, 264. 44

Expenditures by stations, etc.

Cape Charles, Virginia, July 1, 1888, to August 1, 1888	1, 998. 24
Delaware Breakwater, July 1, 1888, to August 1, 1888	4, 366. 39
Florida yellow-fever epidemic to June 30, 1889, including Jacksonville and Camp Perry	227, 599. 61
Havana, Cuba	2, 980. 00
Miscellaneous.....	3, 382. 97
Miscellaneous settlements through First Auditor.....	2, 101. 34
Santiago de Cuba, sanitary inspector, etc	50. 00
Sapelo quarantine, July 1, 1888, to August 1, 1888.....	2, 529. 04
Ship Island quarantine, July 1, 1888 to August 1, 1888	1, 685. 97
Stationery from the Treasury Department	71. 75
Tampa, Fla.....	230. 29
Total	246, 995. 60

Cape Charles quarantine station, 1888-'89.

Appropriation, act approved August 1, 1888.....	\$112,000.00
Expenditures to June 30, 1889.....	14,597.00
Balance July 1, 1889	97,403.00

The above balance will be absorbed in the cancellation of outstanding bills and pending contracts for fumigating steamer, purchase of site (already made, but awaiting legal transfer), construction of wharf, repairs of present hospital buildings and officers' quarters, disinfecting machinery, etc.

Delaware Breakwater quarantine station, 1888-'89.

Appropriation, act approved August 1, 1888.....	\$75,000.00
Expenditures to June 30, 1889.....	9,232.93
Balance July 1, 1889	65,767.07

Pending contracts and outstanding bills will exhaust the above balance in the payment for construction of disinfecting machinery, fumigating steamer (now completed), warehouse, and officers' quarters.

Gulf quarantine station (formerly Ship Island) 1888-'89 (special appropriation).

Appropriation, act approved August 1, 1888.....	\$15,000.00
Repayments for care and treatment of foreign seamen.....	329.00
Repayments for rations furnished	79.09
Total.....	15,408.09
Expenditures to June 30, 1889.....	14,076.77
Balance June 30, 1889.....	1,331.32
Additional expenditures to August 1, 1889, contracted prior to June 30...	1,214.00
August 2, 1889, balance available to pay outstanding obligations..	117.32

Key West quarantine station, 1888-'89.

Appropriation, act approved August 1, 1888.....	\$88,000.00
Expenditures to June 30, 1889.....	3,069.19
Balance July 1, 1889	84,930.81

The above balance will be needed to meet pending and outstanding obligations for construction of disinfecting machinery, warehouse, small boats, steam-tug, hospital buildings, and officers' quarters. Wharf and buildings, \$7,326.

Port Townsend quarantine station, 1888-'89.

Appropriation, act approved August 1, 1888.....	\$55,500.00
Expenditures to June 30, 1889.....	30.00
Balance July 1, 1889	55,470.00

The above balance will be used for the purchase of site, construction of disinfecting machinery, warehouse, small boats, hospital buildings, and officers' quarters.

San Diego quarantine station, 1888-'89.

Appropriation, act approved August 1, 1888.....	\$55,500.00
Expenditures to June 30, 1889.....	317.18
Balance July 1, 1889	55,182.82

Balance to be used for construction of disinfecting machinery, warehouse, small boats, hospital buildings, and officers' quarters.

San Francisco quarantine station, 1888-'89.

Appropriation, act approved August 1, 1888.....	\$103,000.00
Expenditures to June 30, 1889.....	152.85
Balance July 1, 1889	102,847.15

The above balance will be used in settlement of pending contracts for hospital buildings, officers' quarters, disinfecting machinery, warehouse, wharf, steam-tug, and small boats.

South Atlantic quarantine station, 1888-'89.

Appropriation, act approved August 1, 1888.....	\$38,500.00
Expenditures to June 30, 1889.....	14,420.41
Balance July 1, 1889	24,079.54

The above balance will be necessary for the payment of bills for disinfecting machinery, warehouse, wharf, and small boats.

Removal of quarantine station from Ship Island 1888-'89.

Appropriation, act of March 5, 1888	\$45,000.00
Amount expended through Supervising Architect, as per his books, to June 30, 1889.....	\$30,868.16
Expenditures through Snpervising Surgeon-General's Office to June 30, 1889.....	56.60
	30,924.76

Balance July 1, 1889	14,075.24
Expended to August 1, 1889, as partial payment on fumigating-steamer contract prior to June 30, 1889	11,000.00

Balance August 2, 1889.....	3,075.24
-----------------------------	----------

The above balance will be used for payment in part of fumigating steamer now being completed.

In aid of yellow-fever sufferers, 1888-'89.

Appropriation, act approved October 12, 1888	\$100,000.00
Expenditures to June 30, 1889.....	65,909.80
Balance July 1, 1889	34,090.20

There are bills payable, and outstanding claims against the above balance, and some time must yet elapse before the equity of the claims presented can be determined.

From special appropriations.

There have been expended from special appropriations:

From the appropriation for repairs and preservation of marine hospitals (by the Supervising Architect).....	\$15,907.59
Furniture and repairs of furniture	9,613.27
Fuel, lights, and water.....	44,064.38
Heating, hoisting, and ventilating apparatus	10,523.18
Vaults, safes, and locks.....	172.50
Total expenditure on these appropriations.....	80,290.92

REPORT
UPON THE
PREVENTION OF YELLOW FEVER BY INOCULATION,
MADE IN COMPLIANCE WITH INSTRUCTIONS FROM THE PRESIDENT
OF THE UNITED STATES, AND IN ACCORDANCE WITH AN ACT OF
CONGRESS PROVIDING FOR THE CIVIL EXPENSES OF THE
GOVERNMENT FOR THE YEAR ENDING JUNE 30, 1888.

SUBMITTED IN MARCH, 1888,
BY
GEORGE M. STERNBERG,
MAJOR AND SURGEON, U. S. ARMY.

ORDERS.

WASHINGTON, April 29, 1887.

SIR: Referring to the act providing for sundry civil expenses of the Government for the year ending June 30, 1888, especially to the clause providing for the investigation of yellow fever by inoculation, as follows: "And the President is further authorized to use of the same unexpended balance a sum not exceeding \$10,000 for the purpose of investigating the merits of the method practiced in Mexico and Brazil for preventing yellow fever by inoculation," you are hereby directed, under the authority of said act, to proceed to Rio de Janeiro, where you will collate the documentary and other evidence of the experiments by Dr. Freire. Having thoroughly familiarized yourself with the claims of Dr. Freire, you will proceed in person to inquire at the Jura-Juba Hospital, and such other places as may occur to you after your arrival at Rio—

First. The source from which the culture supply is secured, which will involve—

(a) The examination of the alleged germ as shown you by those engaged in the business of inoculation.

(b) Verification of the cultivation and process of attenuation adopted.

Second. The method of the inoculation, which you will see verified, if practicable, on actual cases.

Third. You will report your opinion on the results attained by the process after a careful examination of the cases which have previously been subjected to inoculation. In forming your judgment of these results you will take into consideration the following points:

(a) Personal characteristics of the patient; age, race, nativity, sex, previous susceptibility.

(b) The period since last inoculation; number of times exposed to the contagion.

Having completed this study, you will then proceed to Mexico by the shortest and most practicable route and investigate, in the same manner, the method of inoculation practiced by Dr. Carmona y Valle, and the same method will be observed in conducting the investigation.

While your attention is directed specifically to these points and details, with the expectation that they will be carefully kept in view and adopted for your guidance, they are not intended to exclude such additional methods and means of investigation as your judgment may approve in the thorough and careful accomplishment of the purposes of your mission.

In order that every facility may be afforded you for the prosecution of the work, you will make known your errand to the United States minister at Rio de Janeiro and the United States minister at the city of Mexico, respectively, and request them to use their influence in procuring such access to the hospitals and such other sources of information as you may desire. You will refrain from making publication of your investigations and the conclusions reached by you until you shall have submitted to

me the completed report. You will forward your vouchers for traveling expenses, from time to time, to the Supervising Surgeon-General of the Marine-Hospital Service for payment, certifying the same before any consular officer where you may be at the time.

You will also make requisitions on the Supervising Surgeon-General for such scientific appliances as may be necessary to accomplish the object of your journey.

It is expected that your investigation will be completed by the 1st of October.

GROVER CLEVELAND.

Maj. GEORGE M. STERNBERG.

Surgeon, U. S. Army.

LETTER OF TRANSMITTAL.

BALTIMORE, MD., *March* —, 1889.

To the PRESIDENT:

I have the honor to transmit herewith a detailed report of the investigations which I have made in compliance with your instructions dated April 29, 1887.

The conclusions reached are definite so far as the methods of inoculation practiced in Brazil and in Mexico are concerned; but, unfortunately, the question of the etiology of yellow fever is left in an unsettled state.* The limit as to time fixed by my orders, and the fact that the disease was not prevalent either in Brazil or in Mexico at the time of my visits to those countries made it impossible for me to make certain researches which I consider extremely important in connection with the subject under investigation.†

* * * * *

Very respectfully, your obedient servant,

GEO. M. STERNBERG,
Major and Surgeon, U. S. Army.

* The question of etiology was not included in the law, which only contemplated the study of the method practiced by MM. Freire and Carmona y Valle. Dr. Sternberg is understood to be engaged at present in the separate study of the etiology of yellow fever, under authority of a subsequent executive order.—ED.

† Since this report was submitted the writer has made extended researches in Havana, Cuba, during the summers of 1888 and of 1889, and in Decatur, Ala., during the epidemic of last year. The results of these researches will be embodied in a report to be submitted hereafter. For the present it suffices to say that these results fully confirm the conclusions reached in the present report with reference to the claims of Dr. Domingos Freire, of Brazil, or of Dr. Carmona y Valle of Mexico, to have discovered the specific infectious agent in the disease under investigation—i. e., that these claims have no scientific foundation.

BALTIMORE, *September* 20, 1889.

PREFACE.

Having for some years been deeply interested in questions relating to the etiology and prophylaxis of the infectious diseases, and particularly of yellow fever, the writer was glad to undertake the investigation to which the following report relates, especially as it would give him a long-sought opportunity to supplement observations made in Havana, in 1879, by additional experiments, made by methods which have been perfected since that date. It must be admitted that the published works of Dr. Freire, in Brazil, and of Dr. Carmona y Valle, in Mexico, did not inspire him with much confidence as regards the scientific value of the alleged discoveries made by these gentlemen; but while it was evident from their writings that they had fallen into gross errors, the possibility remained that there was a germ of truth in the background. The published statistics of Dr. Freire, especially, were so favorable to his claim that he had discovered a method of prophylaxis by inoculation that a critical examination upon the spot was evidently the only way of ascertaining the exact value which should be accorded to these statistics.

It is always an ungrateful task to criticise the work of those who have earnestly and conscientiously sought to elucidate unsettled questions in science, and especially so when the object in view is the amelioration of human suffering. It would have been extremely gratifying to the writer if he had been able to announce as the result of his investigations that the specific germ of yellow fever has been discovered in Brazil or in Mexico, and that a reliable method of prophylaxis by inoculation is now successfully practiced in one or the other of these countries. Such a report would be easily written and gladly received by the medical profession in this country and in Europe; but unfortunately I am unable to make a favorable report, and to sustain a negative and show wherein the gentlemen above named have, in my opinion, been mistaken, calls for an elaborate and extended statement of facts, which I am aware will have but little interest for a majority of the profession; but those who do take the pains to read it will find, I trust, that I have fully sustained the positions taken; and for those who in future may undertake to elucidate the unsettled questions relating to the etiology of yellow fever, the report will be found, I believe, a useful beacon, showing the rocks and quicksands in the way of the investigator in this field of science, and the absolute importance of proper training and familiarity with modern methods, and with the results of the most recent researches, before entering upon a path in which so many pioneers have gone astray.

REPORT UPON THE PREVENTION OF YELLOW FEVER BY INOCULATION.

INTRODUCTION.

At the annual meeting of the American Public Health Association, held in Washington in the month of December, 1885, resolutions were introduced by Dr. Joseph Holt, president of the Louisiana State board of health, calling for the appointment of a commission by the National Government for an investigation of the merits of the protective inoculations against yellow fever which had been practiced in Brazil and in Mexico.

These resolutions were adopted by the association, and, through the influence of Dr. Holt, upon the assembling of the Forty-ninth Congress a bill was introduced providing for a commission of three members, and an appropriation of \$25,000. This bill passed the Senate but met with some opposition in the House, and was subsequently modified to meet the views of a minority of the Committee on Commerce, to which it had been referred. As modified the bill received the unanimous approval of this committee and was again reported to the House by Hon. R. C. Davis, of Massachusetts, to whom it had been referred as a subcommittee. Under the rules it could not be considered except by unanimous consent, and the opposition of a single member prevented it from being submitted to a vote. During the next session of Congress a clause was introduced into the act providing for the sundry civil expenses of the Government for the year ending June 30, 1888, appropriating \$10,000 for the investigation. This appropriation was secured mainly through the exertions of Dr. Davis, and the active interest of the Louisiana delegation in Congress.

The President designated the writer to carry out the investigation referred to, and by special orders from the War Department I was directed to report to the honorable Secretary of the Treasury, and received through him detailed instructions (p. 135-6) signed by the President.

In compliance with these instructions I sailed for Rio de Janeiro, per steamer *Allianca*, on the 4th of May, 1887, taking with me a complete "field outfit" for bacteriological investigation. I took with me a series of first-class objectives, including the one-eighteenth inch and one-twelfth inch homogeneous oil immersion lenses of Zeiss, which I have found to be unsurpassed for bacteriological researches, and have had in almost constant use since 1879, when they were purchased for the use of the Havana Yellow Fever Commission. I was able to start by the first steamer which sailed after I received my instructions, because my preparations had for the most part been made some time before. In anticipation of the passage of the bill before Congress in 1886, and having been assured by those who were interested in its passage that it was their desire that I should make the investigation contemplated, I made my preparations for field work during the months of May and June of that year, and the boxes containing my apparatus and sterilized culture material had remained packed since

that date. I had provided a large supply of flesh-peptone gelatine, of agar-agar, and of *bouillon* in hermetically sealed tubes, which having been thoroughly sterilized and being secure from injury by drying of the culture-medium, could be preserved indefinitely.

The voyage to Rio occupied twenty-seven days; the steamer touching during the passage at the islands of St. Thomas and Barbadoes, and at Para, Maranhão, Pernambuco, and Bahia, sea-ports of Brazil.

Upon my arrival in Rio I at once presented my credentials to the Hon. Thomas J. Jarvis, United States minister and envoy plenipotentiary to Brazil. I was received with great courtesy, and Governor Jarvis subsequently did everything in his power to further the object of my mission, and to make my stay in Brazil as agreeable as possible. Minister Jarvis presented me soon after my arrival to the Baron Cotegepe, prime minister of the Empire, and later I was presented at court to the Princess Isabella, Regent of the Empire during the absence of her august father, Dom Pedro II.

Dr. Domingos Freire, whose claims I had come especially to investigate, was absent in Europe at the time of my arrival. He had gone to France some time previously for the purpose of demonstrating his yellow-fever germ, and calling attention to his method of prophylaxis. I was, however, immediately after my arrival, installed in his laboratory in the school of medicine by the director of the faculty, and received the assistance of his former assistants and pupils, Dr. Chapot Prévost and Dr. Joaquim Caminhoa, to whom I express my obligations, as also to the father of the last-named gentleman, Conselliero Caminhoa, who called upon me immediately after my arrival and made offers of his services in any way that I might desire. These gentlemen were ardent advocates of the method of inoculation practiced by Dr. Freire, and believers in his *cryptococcus xanthogenicus*. I subsequently learned that in this regard there were two parties in Rio, and that the question had been very freely discussed both in the newspapers and in the Imperial Academy of Medicine, in the printed bulletin of which a complete record of their discussions was preserved.

So far as I could learn, the leading and more experienced members of the profession were for the most part extremely skeptical as to the reliability of the alleged discovery and method of prophylaxis, or fully convinced that the claims of Dr. Freire were without foundation, and outspoken critics of his methods and statistical results. On the other hand, Dr. Freire had a certain following among the younger members of the profession, and especially among the medical students, and was looked upon by these as "the Pasteur of Brazil." The very severe criticism which he had received at the hands of certain prominent members of the Imperial Academy of Medicine was looked upon by his personal friends as the persecution which it is so often the fate of discoverers to encounter at the hands of conservative and jealous confrères.

In 1885, when Dr. Freire published his elaborate work, "*Doctrine Microbienne de la Fièvre Jaune*" at the expense of the Government, he was president of the central board of public hygiene, and seems to have had the full support of the Government in his attempts to elucidate the etiology of the endemic pestilence which interfered so largely with the development of the capital city of the empire. Two assistants of his selection were assigned to him and money seems to have been expended freely in his experimental researches and publications. At the time of my visit to Rio Dr. Freire was no longer in special favor with the Government, and the central board of public hygiene was composed of men who were not favorable to his method of inoculation, and indeed included the names of some of his most vigorous and successful critics. Prominent among these was Dr. Arango Góes, a gentleman who was of great assistance to me during my stay in Brazil. At my first interview with the prime minister, the Baron Cotegepe, the name of Dr. Góes was mentioned as one who enjoyed the confidence of the Government, and who had given much attention to the study of the disease I had come to investigate. I found Dr. Góes to be an extremely well-informed physician, a competent microscopist, and one of the pioneers in Brazil in bacteriological studies, especially with reference to yellow fever. He has been

prudent enough not to publish prematurely the results of his investigations, but has made extended experimental studies, and has especially devoted himself to the microscopical examination of sections of the various organs, made *secundum artem*, and stained with various aniline dyes, a method which Dr. Freire seems to have neglected entirely, for neither himself nor his pupils exhibited to me a single mounted preparation showing the "*Cryptococcus xanthogenicus*" in the tissues, or in blood obtained from the victims of yellow fever. Nor did I find in Dr. Freire's laboratory any pathological material preserved in alcohol, for the purpose of histological study. On the contrary, I am indebted to Dr. Góes for material from quite a number of cases, in which he had himself made the autopsy. Although in feeble health Dr. Góes still devotes much of his time to microscopical studies, in the physiological laboratory of the National Museum, which is in charge of Dr. J. B. de Lacerda. The last-named gentleman also gives much time to bacteriological studies, and is especially engaged at present in the study of beri-beri, a disease which prevails extensively on the littoral of Brazil from Rio de Janeiro northward. I desire to express here my obligations to Dr. Lacerda for numerous favors, and especially for having made me at home in his laboratory, where I found a culture-oven in operation and where a considerable part of my work while in Brazil was done.

Dr. Góes was of the greatest assistance to me during my entire stay in Brazil. He went with me to the hospitals in search of yellow-fever patients, and aided me in collecting blood for microscopic examination and culture experiments. The yellow-fever season was about at an end when I arrived in Brazil, but I was fortunate enough to find a few typical cases and to obtain specimens of blood—drawn from the finger—for study. But, although several of these cases terminated fatally, I did not succeed in obtaining an autopsy. This was due to the fact that as soon as the diagnosis of yellow fever was established in a case in the wards of the Misericórdia Hospital, or elsewhere in the city, the patient was at once transferred to the small-pox hospital, the Jurajuba Hospital, designed especially for the reception and isolation of yellow-fever patients, having been closed at the end of the epidemic season. I followed two cases to the small-pox hospital, and collected blood from the finger of one whom I found in a ward with ten or fifteen variola patients, and who ejected black vomit in my presence. I was extremely anxious to obtain an autopsy in this case for the purpose of making cultures from blood obtained from the heart and from material from the interior of the organs in which the principal pathological lesions are found, but, unfortunately, did not receive notice of the man's death until he was already buried. This also occurred in another fatal case, notwithstanding the fact that I made every effort to receive immediate notice of the fatal termination of these cases; and in a fatal case at the Misericórdia Hospital Dr. Góes and myself arrived just ten minutes too late for an autopsy, the body having already been sent to the cemetery, although the man had been dead but an hour.

The epidemic season in Rio commences usually in December and extends to the last of April. The following table shows the mortality by months from the 1st of January, 1886, to the 1st of May, 1887, during which period a very complete monthly bulletin of mortality statistics has been published by the Inspectoria Geral de Hygiene. In parallel columns I have placed the mean temperature for the month, and the total amount of rainfall in millimeters and in inches.

Month.	Yellow fever.	Mean temperature.		Total rainfall.	
	Mortality.	C.	Fahrenheit.	Millimeters.	Inches.
1886.					
January.....	135	25.3	77.5	26.2	1.03
February.....	234	24.6	76.3	278.1	10.94
March.....	347	25.3	77.5	76.9	3.02
April.....	220	23.9	75.0	223.9	8.81
May.....	48	20.7	69.2	8.9	.35
June.....	18	19.6	67.3	42.8	1.68
July.....	9	18.6	65.5	39.4	1.55
August.....	2	18.6	65.5	136.5	5.37
September.....	0	20.3	68.5	116.7	4.59
October.....	1	20.7	69.2	35.0	1.37
November.....	0	22.7	72.9	35.0	1.37
December.....	1	23.4	74.1	226.7	8.92
Total.....	1,015				49.00
1887.					
January.....	6	25.6	78.1	233.8	9.20
February.....	16	25.3	77.5	76.4	3.00
March.....	19	24.3	75.7	205.8	8.10
April.....	22	23.3	73.9	114.3	4.49

It will be seen from this table that while there was a considerable epidemic in 1886, which terminated, as usual in the month of May, the year 1887 has been characterized by a remarkable exemption from the ravages of the endemic scourge. We can not account for this on the ground of a lower temperature during the epidemic season, for in fact the average temperature for the month was higher in January and February, 1887, than in the corresponding months of 1886. During the months of March and April, however, the temperature was somewhat lower in 1887. The total rainfall for the four months was about the same. The year 1885 was also one of comparative exemption from yellow fever, the total number of deaths having been but three hundred and seventy-five. In a disease which finds its victims for the most part among unacclimated strangers, the mortality will of course depend largely upon the number of new-comers who are exposed to the epidemic influence. This is doubtless one of the principal causes of the fluctuation in the mortality curve from year to year. Not only does a large portion of the susceptible population suffer an attack during an epidemic, and thus enjoys subsequent immunity, but the large mortality induces strangers to avoid the infected city during the following epidemic season. Again an epidemic serves as a stimulus to the local health authorities, and more attention is given to the sanitary police of the city.

All Brazilian authorities agree that yellow fever was first introduced into Rio in the year 1849, but there is reason to believe that it had prevailed in Pernambuco as far back as 1686.

The Portuguese author, Sebastião da Rocha Pitta, has given an account of this epidemic in his "History of Portuguese America," published in Lisbon in the year 1730. This author says (Book VII, p. 427, *et seq.*):

"These disturbances were in Pernambuco the first presages of the fatal disease *Bicha*, and soon after of the dreadful eclipse of the moon, which was witnessed with horror in that province, and in that of Bahia.

In the month of December, 1685, the presiding luminary of the night appeared all ablaze, as if it had concentrated within its service the whole region of fire, the greater part of its immense surface being enveloped in this seeming cloak of flames. Some months before there had been an eclipse of the sun, which was surrounded by a mist, called by a celebrated astrologer, the jesuit father Valentin Extancel, 'the sun-spider.'

"On these two eclipses the priest wrote a mathematical treatise, in which he predicted great calamities for Brazil. It is true that eclipses are natural, being caused by

the earth, which enters the orbits of the two greater planets, but through these phenomena the air, from known or hidden causes, may be corrupted and from its corruption result diseases, if not in all the world, at least in some parts of it, as has been shown by the plagues and calamities, of which there are many examples preserved in traditions and writings, and others still fresh in the memory of persons now living.

"Year 1686.—In the year 1686 commenced in Pernambuco that terrible plague (contagious disease *Bicha*) which must be attributed to the sins of the population of these provinces, corrupted by vices into which they were enticed by the wealth and freedom of Brazil. Many causes are alleged, the most worthy of attention being the arrival of some barrels of meat which returned from the island of São Thomé. These were opened by a cooper who shortly afterward fell dead. Soon after several persons of his family, to whom he had communicated the disease, also died. The epidemic spread to such an extent among the inhabitants of Recife (Pernambuco) that the mortality exceeded two thousand, which was very large in proportion to the population.

"Thence the disease extended to Olinda and its vicinity, and very few were the persons who escaped it, such was its virulence and intensity. The variety of the symptoms puzzled the medical profession whose members could only agree on one point, that of giving it the name *Bicha*. Few patients recovered, and numberless were those who died. The deserted hearthstones and the families deprived of their protectors attested the ravages of the disease."

The historian mentions certain clinical features of the disease, to which he refers, which make it appear extremely probable that the epidemic malady described by him under the name *Bicha* was nothing more nor less than yellow fever, but we have no further account of the prevalence of this disease upon the coast of Brazil until quite a recent date.

The highest medical authorities in Brazil agree that yellow fever was not endemic in the principal seaports of the empire prior to the year 1849, when it was introduced to the city of Bahia by the North American brig *Brazil*, which sailed from New Orleans, where yellow fever was prevailing, and touched at Havana. Two of the crew of this brig died of yellow fever during her voyage from the latter port to Bahia. Soon after her arrival the disease made its appearance among those who had communicated with the ship, and later on other vessels in the harbor. The first case occurred a few days after the arrival of this brig (November 3). A part of her cargo is said to have consisted of little barrels of beef which had become putrid. From Bahia the disease was carried to Rio Janeiro, where during the epidemic season of 1850 it caused a mortality of 4,160.

According to Professor Barata, of the Faculty of Medicine of Rio Janeiro, yellow fever continued to prevail in Brazil until the year 1861, when it disappeared for eight years, to re-appear in 1869-70, as a result of a fresh importation. The Italian ship *Creolla del Plata*, which had touched at St. Iago, where yellow fever was prevailing, is named as the vessel which introduced the disease on this occasion.

The mortality from the disease under consideration in the city of Rio, from the time of its introduction in 1850 to a recent date, is shown by the following table:

Year.	Mortality.	Year.	Mortality.	Year.	Mortality.	Year.	Mortality.
1850.....	4,160	1860.....	1,249	1869.....	274	1878.....	1,174
1851.....	475	1861.....	247	1870.....	1,117	1879.....	974
1852.....	1,943	1862.....	12	1871.....	8	1880.....	1,433
1853.....	853	1863.....	0	1872.....	102	1881.....	219
1854.....	21	1864.....	0	1873.....	3,659	1882.....	95
1855.....	0	1865.....	0	1874.....	89	1883.....	1,336
1856.....	0	1866.....	0	1875.....	1,292	1884.....	618
1857.....	1,425	1867.....	0	1876.....	3,317	1885.....	278
1858.....	800	1868.....	0	1877.....	282	1886.....	1,015
1859.....	500						

In 1855 yellow fever is said, by Hirsch, to have prevailed extensively in Brazil, although this was not an epidemic year in Rio Janeiro. The following year it extended along the Amazon far into the interior of the country. The years of greatest epidemic prevalence since that date have been 1859-60, 1862, 1869-70, 1872-73, 1875-77 (Hirsch).

From Brazilian ports the disease has occasionally been introduced to the cities at the mouth of the Rio de la Plata, and has there caused great loss of life. The first epidemic at Montevideo was in 1857, and it was again introduced into this city, from Pernambuco, in 1872. It prevailed in the city of Buenos Ayres in 1858 and in 1870.

We have already stated that the year 1886 was considered an epidemic year, the total mortality having been 1,015. It will be of interest to compare with this figure the mortality from certain other diseases, for the same period. We obtain the following from the official bulletin already referred to:

	Mortality.
1. Tuberculosis	2,677
2. Diseases of the circulatory apparatus.....	1,458
3. Diseases of the cerebro-spinal apparatus.....	1,345
4. Diseases of the digestive apparatus.....	1,097
5. Malarial diseases.....	1,086
6. <i>Yellow fever</i>	1,015
7. Diseases of the respiratory apparatus.....	988
(Variola 164, typhoid fever 114, beriberi 67.)	

It will be seen that so far as the general population is concerned, yellow fever is a disease of minor importance, inasmuch as, even in an epidemic year, it takes the sixth place among the causes of death enumerated. But the mortality from this disease being almost exclusively among the foreign population it is a matter of prime importance to strangers visiting the capital of Brazil, to the commercial interests of the city, and the general development of the country by immigration.

The population of Rio is estimated, in recent official reports, at 400,000, and the total mortality, upon this basis, was 30.75 per thousand during the year 1886, while the mortality from yellow fever was 2.54 per thousand. The total mortality is certainly excessive for a city so favorably located, and no doubt could be very much diminished by the execution of needed sanitary improvements, and by a more rigorous sanitary supervision of the city. It is not too much to say that by well executed sanitary measures the endemic plague so fatal to strangers could probably be entirely banished from this beautiful city, which is so highly favored by its situation and surroundings.

Dr. Freire returned from Europe about the 1st of July, and on the 4th I met him by appointment in his laboratory, where from this time until my departure from Brazil I was a constant visitor, and where he undertook to demonstrate to me the specific character of the micrococci, which he presented to me as his yellow fever *microbe*, by a series of experiments upon animals, which are detailed in the body of my report.

I desire to express my thanks to Dr. Freire for his uniform courtesy and for copies of his various publications, and for the assistance rendered me in various ways in the pursuit of the object of my mission. Dr. Freire is entitled to much credit for the zeal and perseverance with which he has pursued his experimental studies for a number of years; and if, as I believe, he has fallen into serious errors, it must be remembered that he is not alone in this particular, and that, especially in this field of investigation, many men well known as pathologists, chemists, etc., have been led quite as far astray. Indeed, reliable methods of investigation are of such recent date that the records of work done a few years since in various parts of the world abound in errors of observation and of inference which would at present be inexcusable. The remarks just made apply as well to the work of Dr. Carmona y Valle, of Mexico, who, as I shall show in the body of my report, has fallen into errors of the same kind.

Dr. Freire's laboratory is equipped for the most part with apparatus of French manufacture, including the *étuve d'Arsonval*, and his cultures prior to his departure

for France had evidently been made for the most part, if not entirely, in Pasteur flasks—*petits ballons*. In three closets, respectively, labeled "Cholera," "Cancer," and "Yellow fever," were numerous flasks containing fluid cultures. I was subsequently informed by him that his stock for his cholera cultures came from Dr. Ferran, of Spain, and that his cancer closet contained cultures obtained by himself from cases of cancer. Soon after my arrival Dr. Freire's principal assistant in his bacteriological work, Dr. Chapot Prévost, selected from the yellow fever closet a flask dated February 13, 1885, which he believed to contain the *cryptococcus xanthogenicus*. A biological analysis of the contents of this flask, made by means of Esmarch's tubes, showed that it contained several different bacilli, but no organism corresponding with Dr. Freire's description of the yellow fever microbe. I had previously made a biological analysis of some of the vaccine used by Dr. Freire in his inoculations, which was brought to the United States in a sealed glass tube by Dr. Lane, an American, who has resided for many years in Brazil. This came to me through the courtesy of Dr. Chisholm, of Baltimore, and Prof. William Welch, of Johns Hopkins University. This also contained several different organisms, but none that I could identify with the *cryptococcus xanthogenicus*. Dr. Freire's laboratory was not provided with Koch's culture apparatus, or with the Zeiss homogeneous immersion objectives, but he had a good French stand and an immersion No. 10 of French manufacture. Upon Dr. Freire's return from France he brought with him some cultures in agar-agar which were evidently a novelty in his laboratory. This collection included *Bacillus prodigiosus*, commonly called micrococcus prodigiösus; *Rosa heja*, the bacillus (micrococcus) of fowl cholera, and of rabbit septicæmia, and two or three other well-known organisms. It also contained a tube said to be a pure culture of the yellow fever microbe, which, to my surprise, proved to be a micrococcus not differing in its morphology from certain well known and widely distributed forms—e. g., *Staphylococcus pyogenes albus*. Details with reference to experiments made with this coccus will be found in my report.

A considerable portion of my time while in Rio was devoted to an investigation of the results of the protective inoculations practiced by Dr. Freire in 1884, 1885, and 1886, and in personally visiting the *corticos*—tenement courts—in which a large proportion of the inoculations had been made. I was assisted in this investigation by Dr. R. Cleary, an American physician, who has resided for many years in Brazil, and has recently located in Rio for the practice of his profession. Dr. Cleary's assistance, rendered without compensation, was extremely valuable to me on account of his knowledge of the Portuguese language and of the habits and characters of the lower classes of the population among whom the inoculations had been made. I take this occasion to thank him for his kind assistance.

I also employed for six weeks a gentleman of American birth, who is now a citizen of Brazil, to assist me in making these researches, and in translating from the Portuguese articles from the newspapers and from the printed proceedings of the Imperial Academy of Medicine, relating to Dr. Freire's inoculations. Mr. Slaughter, the gentleman referred to, visited the address of a considerable number of the persons inoculated in 1884, for the purpose of ascertaining whether an attack of yellow fever had since occurred. The general results of his researches are given in my report.

As I have already stated, Dr. Freire has failed to convince any considerable number of his medical confrères of the veritable nature of his discovery, or of the value of his protective inoculations, and his work has received very severe, and as I think just, criticism at the hands of some of the members of the Imperial Academy of Medicine. On the other hand he has some ardent admirers among his colleagues of the faculty of medicine and the students who have attended his lectures as professor of organic and biologic chemistry.

Among the laity there are, as might be expected, a variety of opinions. Persons unaccustomed to scientific methods are very liable to form positive opinions upon very imperfect evidence. Thus one intelligent gentleman told me that he had a great deal of faith in Dr. Freire's inoculations, for his barber had been inoculated, and had

not contracted yellow fever. Yet this gentleman was perfectly aware that there are thousands of foreigners—English, Germans, French, Portuguese, and Americans—in Rio who have passed through one or more epidemics of yellow fever without contracting the disease, and who have not been inoculated. Another intelligent merchant gave as evidence of the success of Dr. Freire's inoculations the case of a Portuguese family recently arrived in Brazil, consisting of three members, a man, his wife, and his wife's mother. The two women were inoculated by Dr. Freire; the man was not. All three were taken sick during the epidemic season; the man died, and the two women recovered after a very severe attack of the disease. Instead of giving evidence of the protective value of the inoculation practiced, as my informant was disposed to believe, this case seems to me to prove the contrary, for the two women suffered severe attacks of the disease. The circumstance that they did not die while the man attacked at the same time did is not at all remarkable or unusual, and there is no reason for ascribing it to the fact that they had been previously inoculated.

Beside this case we may put that of the family referred to in a communication from the Baron de Ibituruna, president of the central board of health: "There have already been recorded many deaths among persons inoculated with the 'microbian liquid,' including a respectable family vaccinated a year ago in Catumbi. One member of this family died of a pernicious lymphatitis a few days after vaccination, and another of yellow fever a little over two months ago. Every one else in the house had yellow fever, although vaccinated. The person who fared best, having only a mild attack, was one who was absent when Dr. Freire invaded the house and performed the vaccinations without the previous consent of the head of the family."

Again, as showing the kind of evidence which satisfies some minds, I may refer to the case of an American physician and missionary residing in San Paolo. This gentleman came to Rio during the prevalence of yellow fever in 1886, *en route* to the United States. He was inoculated by Dr. Freire, and published his case as evidence of the protective value of such inoculations. But I am informed by no less an authority than our minister to Brazil that this gentleman sailed for the United States a short time after the inoculation was practiced, and that he spent the intervening time at Petropolis, where yellow fever never prevails. Moreover, I am informed from another source that the gentleman referred to was some years ago engaged in business in the city of Rio, and resided in that city for several years. What protected him from contracting yellow fever at that time? Or, if he had the disease then, what value can be attached to the fact that he did not have it after being inoculated? Again, I may point to the fact that many foreigners, including the American consul, passed through the entire epidemic season of 1866, remaining in the city of Rio, without contracting the disease, although they had not been inoculated.

I desire to express here my thanks to Dr. Nuno d'Andrada, director of ports, and to Dr. L. M. Pinto Netto, director of the Jurajuba Hospital, for their kindness in giving me an opportunity to visit the yellow-fever hospital, and for a transcript of the mortality lists for the years 1884, 1885, 1886, and 1887. I am also indebted to Dr. Carlos Frederic, medical inspector-general of the army, for his courtesy in showing me the admirable military hospital under his direction, which is located upon an island in the bay of Rio.

I sailed from Rio on the 11th of August with the intention of taking a steamer at Barbadoes or at St. Thomas, if I should find one in either of these ports which would take me to Vera Cruz or to some port in direct communication with that city. But owing to the prevalence of small-pox in Brazil no passengers were permitted to land from our steamer at the ports mentioned, and I had no choice but to go on to New York.

From New York I proceeded by rail to the city of Mexico, for the purpose of making the acquaintance of Dr. Carmona y Valle, and of investigating his method of inoculation. My orders required me to complete my investigation by the first of October,

but it was evident that the time remaining was insufficient to enable me to comply in a satisfactory manner with that portion of my instructions relating to "the method of inoculation practiced by Dr. Carmona y Valle." I therefore addressed the following letter to the honorable Secretary of the Treasury on the day of my departure:

BALTIMORE, *September 6, 1887.*

SIR: I have the honor to report my departure this day for Mexico, in compliance with special instructions signed by the President.

As explained in my letter of September 4, I was unable to proceed to Mexico by way of Barbadoes or St. Thomas on account of the quarantine at those ports, which prevented any passengers from Brazil from landing. My shortest practicable route was therefore by way of New York.

I would respectfully request that the time fixed for the investigation with which I am charged may be extended for twenty days. It will be about the middle of September before I can reach Vera Cruz, and if I am required to return to Washington by the 1st of October, in compliance with my present orders, it is evident that I can not make an investigation that would be creditable to myself or to the Government.

I shall collect pathological material in Mexico for study in my laboratory during the winter, and it is my desire to make certain researches and experiments after my return to Baltimore, which seem to me to be essential in order to clear up some unsettled questions in connection with the subject of protective inoculations against yellow fever.

So far as I can judge at present this work will occupy me for about four months, at the expiration of which time I will be prepared to make a detailed report of the results of my investigations.

If the twenty days additional time which I consider necessary in Mexico is granted, I would respectfully request that I may be so informed by letter or telegram addressed to me in care of the United States minister in Mexico.

Very respectfully,

GEO. M. STERNBERG,
Surgeon, U. S. Army.

THE SECRETARY OF THE TREASURY.

In reply to this communication, I received the following:

TREASURY DEPARTMENT,
Washington, September 17, 1887.

SIR: Referring to the special instructions given you at the time of your detail to conduct the investigation relative to the method of inoculation for the prevention of yellow fever as practiced in Brazil and Mexico, you are hereby granted twenty days' additional time for the conduct of the investigation, as requested in your letter of September 6.

By direction of the President.

Respectfully yours,

HUGH S. THOMPSON,
Acting Secretary.

Maj. GEORGE M. STERNBERG,
Surgeon U. S. Army, City of Mexico, Mexico.

Immediately upon my arrival in the City of Mexico I presented my credentials to the United States minister, Judge Maynard, who received me very kindly, and the following day presented me to Mr. Marascal, secretary of foreign affairs, and to General Diaz, President of the Mexican Republic. From these gentlemen I received assurances that the Government would do all in its power to further the object of my mission, and the following day Mr. Marascal was kind enough to send me a letter to Prof. Carmona y Valle, who is director of the faculty of the national medical college of Mexico, and another to the governor of the State of Vera Cruz, through whom I would be able to obtain the facilities required in the prosecution of my investigations in the city of Vera Cruz.

Prof. Carmona y Valle received me with great courtesy and at once made an appointment with me to visit his laboratory, which is favorably located at the very top of the medical college building. At the laboratory I met his principal assistant, now professor of bacteriology in the medical faculty, Dr. Angel Gavino Yglesias. I was much pleased with the laboratory, which is kept in perfect order and is well equipped with

all the apparatus required for bacteriological researches. It contained a complete set of Koch's apparatus, apparently a recent acquisition, two of Zeiss's largest microscopes, and a full series of objectives by the same maker; also a large English binocular microscope. Prof. Carmona y Valle exhibited to me cultures of his yellow-fever microbe, and mounted preparations of the same, stained with the different aniline colors; also well-made sections of the liver and kidney, stained in hamotoxylin and in picro-carmin. These preparations were the work of Dr. Gavino, and I take pleasure in complimenting this gentleman upon his technic. I regret to say that I can not accept Dr. Carmona's conclusions with reference to the origin and etiological role of the micro-organisms which he presented to me as coming from the blood and from the urine of yellow-fever patients. I think I will be able to prove to him in my detailed report that they are altogether accidental and without significance so far as this disease is concerned; that the blood and tissues of yellow-fever patients do not contain organisms such as he exhibited to me in his cultures; that these cultures contain a micrococcus and a bacillus, which are specifically different and bear no relation the one to the other, except the accidental one of being associated in his cultures; that therefore his inference that the spherical organisms—micrococci—are "zoospores" which may develop into bacilli, and that these again break up into spherical organisms is a mistake; that the movements of these "zoospores" observed by him and exhibited to me, which he says are not arrested by a temperature of $160^{\circ}\text{C}.$, or by forty-eight hours' exposure to a 1 per cent. solution of mercuric chloride, are molecular and not vital movements; that the dark-colored granules in his sections of kidney and liver, stained with picro-carmin and hamotoxylin, do not correspond with the organisms contained in his cultures, and in fact are not micro-organisms. While differing radically with the learned professor in all of these particulars, I desire to testify my high appreciation of his landable effort to apply scientific methods to the study of yellow fever. If he had been situated more favorably for the study of this disease I dare say he would have found out for himself the source of the errors into which I believe he has fallen: but having to depend upon others to collect his material at a distant locality his misfortune has been that the specimens of urine and blood which have served to start his cultures contained extraneous organisms, which bear no relation to the disease he had undertaken to study.

At Vera Cruz, the principal Mexican sea-port on the Gulf, yellow fever has been endemic for many years, but at the capital and other cities of the interior in an elevated situation the disease is unknown except for the occasional cases which occur among those who have recently been exposed in the infected sea-port.

No extension of the disease occurs from such cases, and this is in conformity with what has been constantly observed elsewhere, as, for example, at Petropolis, the summer residence of the Emperor of Brazil, and the principal health resort of the court and of the foreign residents of Rio de Janeiro during the summer months. This place is located in the mountains at an elevation of 3,000 feet and is only a few hours distant from the city. It is quite a frequent occurrence for those who seek this place of safety during the epidemic season to go to the city during the day, returning to Petropolis in the evening, and not infrequently such persons fall sick with yellow fever and die; but they do not establish a new center of infection in Petropolis or communicate the disease to those in immediate attendance upon them.

The inoculations practiced by Dr. Carmona y Valle had for the most part been made in Vera Cruz, and this was the place where I hoped to have an opportunity to make some personal observations and experiments relating to the investigation with which I was charged. I proceeded, therefore, as soon as possible to this city. At my request, and by permission of the president of the faculty of medicine (Dr. Carmona), I was accompanied by Dr. Gavino, who took with him the necessary microscopical apparatus to enable him to assist me in my researches. Upon our arrival we established a laboratory in our rooms upon the upper floor of the Hotel de Mexico, and hastened to put ourselves in communication with the physicians in charge of the civil and the military hospitals, who placed their wards at our service and did everything in

their power to further the object of my mission. I am especially indebted to Dr. Daniel Ruiz, director of the civil hospital, for most valuable assistance in my experimental researches. Unfortunately for my object there were but few typical cases of yellow fever in Vera Cruz during the time I was able to remain there (three weeks), and I was not able to secure an autopsy in a single undoubted case. I had supposed that there would be no difficulty in obtaining all the autopsies I desired at this season of the year—the last of September and first October—but the whole summer has been characterized by a remarkable exemption from the disease, and the few cases which I found in the hospitals were of a comparatively mild type and ended in recovery.

The following table shows the mortality from yellow fever in the city of Vera Cruz for each month from January, 1867, to December, 1881. The table is copied from the thesis of Dr. Zacarias R. Molina, a medical officer of the army, who has been for a number of years on duty at the military hospital in Vera Cruz, and who is at the present time also director of the hospital for women:

MORTALITY FROM YELLOW FEVER IN THE CITY OF VERA CRUZ.

Month.	1867.	1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.
January.....	.....	7	.....	.....	3	2	1	1	7	.....	.....	16	6	2	28
February.....	.....	6	.....	.....	.....	2	.....	2	2	1	1	5	4	.....	22
March.....	.....	7	.....	.....	1	4	.....	.....	4	1	.....	.....	2	1	29
April.....	.....	31	2	.....	6	5	3	.....	11	.....	.....	1	1	1	29
May.....	.....	42	.....	.....	19	14	1	2	25	.....	4	7	1	.....	94
June.....	.....	16	.....	.....	113	45	19	3	93	2	7	58	1	.....	233
July.....	8	28	1	.....	71	53	59	11	118	4	54	114	2	1	132
August.....	29	21	1	.....	17	39	59	24	105	7	144	110	1	3	39
September.....	36	21	.....	.....	10	29	44	7	41	9	164	62	3	9	22
October.....	17	9	1	3	15	11	20	12	13	6	77	45	.....	42	25
November.....	11	2	2	5	2	.....	10	11	2	1	50	24	.....	82	18
December.....	8	3	.....	2	4	6	7	6	.....	3	27	7	.....	98	4
Total.....	169	193	7	10	271	210	223	79	425	34	528	444	21	249	675

I have not obtained the total mortality for the city from the year 1881 to date, but the following table, giving the number of deaths in the civil hospital from January, 1882, to December, 1886, will serve as an index of the prevalence of the disease during this period:

DEATHS FROM YELLOW FEVER IN THE HOSPITAL OF SAN SEBASTIAN, VERA CRUZ.

Month.	1882.	1883.	1884.	1885.	1886.	Month.	1882.	1883.	1884.	1885.	1886.
January.....	.....	4	.....	.....	.....	August.....	6	7	.....	29	11
February.....	1	2	.....	.....	.....	September.....	2	16	5	10	6
March.....	1	5	.....	.....	.....	October.....	2	15	2	4	5
April.....	.....	7	.....	.....	.....	November.....	2	6	3	2	.....
May.....	.....	39	1	1	.....	December.....	4	3	2	2	.....
June.....	2	126	.....	6	1	Total.....	22	313	17	90	25
July.....	2	83	2	36	2						

A glance at these tables shows that the season of greatest prevalence is from May to October, but that cases occur during every month of the year; further, that certain years, *e. g.*, 1875, 1877, 1881, are characterized by a very considerable mortality, and may be designated epidemic years, while in other years, *e. g.*, 1869, 1870, 1879, the mortality is comparatively small. The fact that the disease in question is endemic at Vera Cruz is very clearly brought out by these tables, and yet it is evident that the conditions which govern its prevalence are variable, for in certain years the season of greatest prevalence has passed without being marked by an increase in the number of cases, as in 1879 and 1880; and sometimes after a comparatively healthy

summer, an epidemic of moderate proportions has been developed during the autumn months, as in 1880.

Dr. Molina accounts for these fluctuations by differences in the meteorological conditions, and especially in the temperature and prevailing winds, two meteorological factors which at Vera Cruz are closely allied. No doubt these are important elements in accounting for the notable differences in the mortality during different years; but there are other factors to be taken into consideration, and especially the number of insensible strangers present in the infected area during the periods to which the figures relate. The following table which we also copy from the thesis of Dr. Molina shows in parallel columns the temperature, the direction of the prevailing wind, and the mortality from yellow fever during the years 1878, 1879, 1880, and 1881:

MORTALITY FROM YELLOW FEVER, MONTHLY MEAN TEMPERATURE, AND PREVAILING WINDS, CITY OF VERA CRUZ.

Month.	1878.				1879.			
	Temperature.		Winds.	Deaths.	Temperature.		Winds.	Deaths.
	C.	Fahr.			C.	Fahr.		
	°	°			°	°		
January	20. 87	69. 5	NW.-N.	16	22. 76	72. 9	NW.-SE.	6
February	22. 22	72	N.-NW.	5	22. 65	72. 8	NW.-N.	4
March	24. 30	76	SE.-NW.	-----	25. 61	78. 9	NW.-SE.	2
April	26. 89	80. 5	NW.-SE	1	26. 16	79	SE.-NW.	1
May	29. 04	84. 3	SE.-NE.	7	28. 59	83. 4	SE.-NW.	1
June	30. 49	86. 9	SE.-NE.	58	28. 67	83. 5	NW.-SE.	1
July	29. 78	85. 6	SE.-NW.	114	29. 80	85. 6	SE.-NW.	2
August	29. 23	84. 6	SE.-NW.	110	30. 31	86. 5	NW.-SE	1
September	28. 57	83. 4	NW.-SE.	62	27. 08	80. 7	NW.-N.	3
October	27. 33	81. 2	NW.-SE.	45	26. 14	79	NW.-N.	-----
November	25. 15	77. 3	NW.-SE.	24	26. 02	79	NW.-SE.	-----
December	21. 26	70. 2	NW.-N.	7	23. 05	73. 4	NW.-N.	-----

Month.	1880.				1881.			
	Temperature.		Winds.	Deaths.	Temperature.		Winds.	Deaths.
	C.	Fahr.			C.	Fahr.		
	°	°			°	°		
January	23. 03	73. 2	NW.-SE.	2	19. 33	67. 3	N.-NW.	28
February	21. 08	75. 3	N.-SE.	6	19. 68	67. 4	N.-SE.	22
March	25. 60	78. 1	SE.-NW.	1	24. 15	75. 4	SE.-N.	29
April	27. 15	80. 8	SE.-NW.	1	25. 05	77. 1	SE.-N.	29
May	29. 40	84. 9	SE.-NW.	-----	28. 05	82. 5	SE.-S.	94
June	30. 25	86. 4	SE.-NW.	-----	29. 20	84. 6	SE.-S.	233
July	30. 92	87. 6	SE.-NW.	1	31. 15	88. 1	SE.-S.	132
August	30. 10	86. 2	SE.-NW.	3	30. 52	87. 6	SE.-NW.	39
September	28. 50	83. 3	NW.-SE.	9	29. 66	84. 3	SE.-NW.	22
October	25. 30	77. 5	N.-NW.	42	27. 01	80. 6	N.-NW.	25
November	24. 87	76. 7	N.-NW.	92	24. 15	75. 3	N.-NW.	18
December	23. 73	74. 7	N.-SE.	98	23. 15	73. 6	N.-NW.	4

An inspection of the above table shows that northerly winds prevail during the autumn and winter months, and that during the summer easterly and southerly winds are more prevalent. We note that during the months of May, June, and July, 1881, during which yellow fever prevailed as an epidemic, with a mortality for the three months of 459, the wind was constantly from the south and southeast, while during the preceding year it was during the same period from the southeast and northwest, and the mortality was but one. Such a comparison, however, has no great value, for we find that in the same year 1880, after an unusually healthy summer yellow fever

prevailed to a considerable extent during the months of September, October, November, and December, with prevailing winds from the north and northwest, and a temperature lower than during the corresponding months of the preceding year (1879), when there was no yellow fever. Again, we see that this epidemic influence which showed itself in the fall of 1880 manifested itself throughout the whole of the following year. We note, too, that the temperature during the four months of greatest epidemic prevalence in 1881 was lower in two (April and May) and only slightly higher in two (June and July) than during the corresponding months of the preceding year. It is evident, therefore, that other factors must be sought in order to account for the unusual prevalence of the disease during certain years. The general fact shown by the table and by observation, can not, however, be disputed, viz, that the greatest mortality is during the months with the highest mean temperature, and that the prevalence of northerly winds has a tendency to put an end to the epidemic extension of the disease.

The physicians attending the civil and military hospitals in Vera Cruz were, of course, familiar with the claims of Dr. Carmona to have discovered the germ of yellow fever and a method of protective inoculation, but I could not learn that any of them had confidence in the method, which had been extensively tested in Vera Cruz in the year 1885 under their immediate observation. On the contrary, facts were mentioned to me which were directly opposed to an acceptance of the view that the inoculations practiced exercised a protective influence. I shall discuss the evidence relating to this subject in the body of my report, but may remark here that so far as I could learn the results obtained in 1885 were not sufficiently encouraging to induce any one to continue the practice in Vera Cruz, and I believe that Dr. Carmona himself has not made any considerable number of inoculations since the date mentioned. As already stated I found a few non-fatal cases of yellow fever in the hospitals of Vera Cruz, but very much to my disappointment did not have an opportunity to make an autopsy in a single fatal case.* It had been my special desire to inoculate various culture-media with blood from the heart and with material from the liver, kidneys, etc., for the purpose of ascertaining whether any micro-organisms would develop from such material; and also to make cultures from the contents of the stomach, the intestine, and the bladder by puncturing their walls, and thus withdrawing the material through a capillary tube without any danger of external contamination. Such experiments to have value should be made at the earliest possible moment after death. But notwithstanding my desires and best efforts I was obliged to return at the expiration of the time fixed by my orders, and the extension of twenty days for which I had asked, without having made these very important experiments, which possibly might throw light upon the etiological problem which has so earnestly engaged my attention.

I had previously attempted to solve the question as to the presence of micro-organisms in the blood and tissues by direct examination of blood drawn from the finger, in Havana in 1879, and in Rio during my recent visit to that city, and by examining thin sections, stained by various methods, of liver, kidney, and stomach from typical cases of yellow fever. The result of these researches had been negative, but it is possible that by culture-experiments an organism might be discovered that has escaped observation by these methods of investigation. I shall therefore consider my work incomplete in this particular so long as I have not had an opportunity to make inoculations, in suitable sterilized culture-media, with material taken from the organs which show the principal pathological changes in this disease—the liver and kidneys.*

In anticipation of the possibility that I might fail to secure autopsies in Vera Cruz as I had done in Rio, before leaving the last-mentioned city, I wrote to my friend Dr.

*I have since had ample opportunity to make the researches referred to, having made ten autopsies in typical yellow fever cases in Havana in the summer of 1888, and thirty during the summer of 1889.

Daniel M. Burgess, of the Marine-Hospital Service, an American physician, who has been practicing medicine for many years in Havana, requesting him to secure pathological material for me from a number of typical cases of yellow fever. Dr. Burgess had previously sent me such material (in 1885), from two cases, and I had made and stained, by various methods, a large number of sections. But I desired to continue this research and accordingly wrote for more material, with the condition that it must be obtained and put in strong alcohol as soon as possible after the death of the patient. Soon after my return to Baltimore I received from Dr. Burgess material from four typical cases, and later from another. Before leaving Rio I had also received from my friend, Dr. Arango G6es, material from nine cases, which he had preserved in alcohol since the year 1884. The careful study of this material and of the cultures brought back with me from the laboratories of Dr. Freire and Dr. Carmona has occupied a large portion of my time since my return from Mexico. I have also had an opportunity during the past winter to study some cultures made in Havana by Dr. Carlos Finlay, by whom they were sent to Prof. William Welch, M. D., of the Johns Hopkins University. Dr. Welch kindly placed these cultures in my hands and I shall give a detailed account of the result of my examination of them in the body of my report. I desire here to express my thanks to Professor Welch, in whose laboratory my researches have been made, for numerous favors, and for valuable suggestions with reference to the prosecution of my work.

REPORT ON THE CRYPTOCOCCUS XANTHOGENICUS OF DR. DOMINGOS FREIRE.

The claims of Dr. Domingos Freire, of Brazil, to have discovered the specific cause of yellow fever and a method of preventing the disease by inoculation with an "attenuated virus" are contained in the following published works:

1. Recherches sur la cause, la nature et le traitement de la fièvre jaune, Rio, 1880.
2. Études expérimentales sur la contagion de la fièvre jaune, Rio, 1884.
3. Mémoire sur les ptomaines de la fièvre jaune, Rio, 1885.
4. Doctrine microbienne de la fièvre jaune, et ses inoculations préventives; un gros volume de 630 pages. Rio, 1885.
Le vaccin de la fièvre jaune. Résultats statistiques des inoculations préventives pratiquées avec la culture du microbe atténué, de janvier à août de 1885, Rio, 1886.
5. Considérations sur le vaccin de la fièvre jaune (Publiées dans la Revue des cours pratiques et théoriques de la Faculté de Médecine de Rio de Janeiro). Rio, 1886.
6. Notice sur la régénération de la virulence des cultures atténuées du microbe de la fièvre jaune. Rio, 1886.
7. Conférence sur le microbe de la fièvre jaune, prononcée devant la Société de thérapeutique dosimétrique de Paris, et publiée dans le Répertoire universel de la même Société, numéro de mai 1887, Paris.
8. Du microbe de la fièvre jaune et de son atténuation, note présentée à l'Académie des Sciences (en collaboration avec MM. Paul Gibier et C. Rebourgeon), Paris, 1887.
9. Résultats obtenus par l'inoculation préventive du virus atténué de la fièvre jaune (*Idem*), 1887, Paris.

Dr. Freire's principal work, "Doctrine Microbienne de la fièvre jaune," was published in 1885, at the expense of the Brazilian Government, at a time when he enjoyed the confidence of the minister, and was president of the Junta Centrale d'Hygiène Publique. It is illustrated with numerous chromo-lithographic plates, and with sphygmographic tracings, temperature charts, etc.

Dr. Freire's instructions from the minister of the Empire are given in the introduction to this work, as follows:

OFFICE OF THE MINISTER OF THE EMPIRE,
Rio de Janeiro, March 15, 1883.

The Government having decided to give the greatest attention to the study, and to a knowledge of the cause and treatment of the various diseases which attack this city with the greatest intensity, charges you to continue the studies which you commenced in 1880 upon the cause, the nature, and the treatment of yellow fever. You should keep in view that the studies which you make include:

- (1) Microscopic observations and cultures of the microbes encountered in the humors.
- (2) The attenuation of the virulence of the same microbes, and experiments in the vaccination of animals for the purpose of ascertaining if it is possible to employ these microbes as a means of prophylaxis.
- (3) The employment of salicylate of soda as a mode of treatment, by the stomach and hypodermatically.
- (4) Autopsies, and the determination of the anatomico-pathological lesions produced by the morbid process.

I authorize you to name three students, who will each receive a monthly salary of 120\$000 (\$55), to aid you in these studies, which will be made in the maritime hospital of Santa Isabel, in an infirmary which will be designated by the inspector of health, to whom I have this day communicated this resolution.

The Government attaches the greatest importance to your studies, which if they are crowned with a happy result, will merit a recompense proportioned to the services which you shall have rendered.

May God protect you,

PEDRO LEÃO VELLOSO.

In the introduction to his work referred to Dr. Freire claims priority of discovery and confirmation from independent sources in the following language:

"As the question of priority of discovery of the parasite of yellow fever has been agitated, the reader will pardon me if I give here the reasons which favor the right which I consider belongs to me. A year after I had announced my discovery M. Carmona y Valle, professor in the University of Mexico, observing under the microscope different specimens of urine brought from Vera Cruz and coming from patients with yellow fever, found likewise in this liquid the cellular elements, which by the description which he has made of them may be recognized as identical with those which I had so minutely described. * * *. Some differences have arisen with reference to the classification and the development; but I hope that after reading the descriptions which I shall make farther on all doubt will cease, for it will be seen that I have cultivated the parasite with all precautions, all the technical rigor possible; that I have been able to follow its evolution and to characterize it as an alga, a cryptococcus and not a fungus, as M. Carmona thinks, who has not proceeded to employ Pasteur's method of cultivation as I have done.

"Besides, I have also in my favor the observations of Granizo y Ramirez, the author of an important treatise upon yellow fever published this year. This author writes me, 'Your observations have been verified here, not only by myself, but by several of my military colleagues.'

"Dr. Joseph Jones, also, in observing the constitution of the atmosphere during an epidemic of yellow fever in New Orleans, expresses himself as follows in his report to the board of health of Louisiana, published in 1883:

"In this way I have submitted to a microscopical and chemical examination the air of localities and apartments infected with the germ of yellow fever, and I have distinguished a great number of living organic particles, very small, and which might be called spores, having a diameter of one ten-thousandth to one three-thousandth of an inch, also a large number of living animalcules, together with particles of fatty substances, fibers of clothing, and from the bed linen. The spores resembled very much *micrococci* and the *cryptococci* of Hallier. I have observed similar particles in the blood of yellow-fever patients and I have observed bacteria in the air and in the blood."

"These *cryptococci* which Jones found in 1883 in the air and in the blood are not different from those which I have isolated and described in 1880, those which I have proved to be the living factors in the evolution of yellow fever.

"It is true that M. Babes, analyzing (we think with little care) some fragments of viscera which had been sent him by some one in Brazil, I do not know in what condition, in flasks not suitably prepared and in alcohol full of organic dust, has concluded without any further preamble that my observations were badly made. * * * M. Babes has surely been the unconscious victim of some scientific treason. * * * When one has before his eyes the excellent result of the preventive inoculations made, which will be found at the end of the present work, it will be necessary for him to submit to the evidence of facts. * * * I consider, then, this problem of the preventive inoculation of yellow fever, the final end of all my researches, to be entirely resolved."

In the first chapter of Dr. Freire's work at present under consideration the morphology of his *Cryptococcus xanthogenicus* and its mode of development are again given, in accordance with his previous descriptions, as follows:

"When we follow, with all the care and attention possible, the march of the development which characterizes the germs which produce yellow fever, we acquire the certainty that, commencing to present themselves under the form of little points almost imperceptible, they afterwards gradually increase in diameter until they attain considerable dimensions; so that these little beings, which at the outset had the aspect of very little grains of sand, not measuring more than 0.001^{mm} to 0.002^{mm} in diameter, arrive, little by little, to such a development that they reach the dimensions

of 0.005, 0.007, or 0.008^{mm}, and sometimes even more in certain determined conditions.

"When they have attained the adult age these cells are broken at diverse points and discharge their contents, composed of spores already formed, mixed with a viscous substance of a yellow color, composed of a pigmentary and protoplasmic substance, and of the liquids elaborated by the cells. * * *

"The *microbe xanthogenicus* is a cosmopolitan; it does not select its domicile in any organ and has no preference for any organic liquid. We have encountered it with the same characters, the same opulence of proliferation, in the brain, in the muscles, in the liver, in the spleen, in the kidneys, in the lungs, in the blood, in the urine, in the bile, in the vomit, and even in the cephalo-rachidian fluid. However, it is necessary to establish a well-drawn distinction as to the blood. The blood of the general circulation shows itself much less charged with the microbes than the blood of the capillaries. Thus, if I could admit any preference on the part of the *microbe xanthogenicus*, I would say that it pleases itself better in the blood of the capillaries, in the blood which bathes immediately the anatomical elements. * * *

"The occasion seems to us a favorable one in order to call attention to some indispensable precautions when the microbes of yellow fever are to be sought in organic solids and liquids. While it is extremely easy to perceive the presence of the microbes of yellow fever in the urine and the bile, for example, by placing a drop of these liquids upon a glass slide, covering it with a thin glass cover, and examining it with a power of 450 to 740 or 780 diameters, this proceeding can not be employed when the blood is to be examined. If we proceed in this manner the globules will hide nearly all of the microbes, and the observer will wrongly conclude that they are very rare in this organic liquid. Not only does the form of the microbe offer a certain resemblance to that of the red corpuscles, but these latter in adhering together envelope the microbial cells, and, on the other hand, cast upon the cells a jet of light which makes them disappear from the field of the microscope. But if we dilute a little drop of blood in a pure solution of sulphate of soda and place it under the objective, the microbes become visible and will appear in considerable quantity.

"It is likewise necessary to make a preparation previously for the examination of the cerebral mass and of the muscles. They should be triturated in a sterilized mortar and mixed afterward with distilled water entirely deprived of organisms, filtered through fine linen which has been passed rapidly through the flame of an alcohol lamp, and afterwards a drop of the filtered liquid should be placed upon a glass slide. If we withdraw a little piece of brain or of muscular fiber, even triturated, we will not perceive anything abnormal under the microscope unless it be the anatomical elements more or less deformed by trituration.

"It is not the same for the liver. It suffices to withdraw a bit of this organ and to crush it between two glass slides; upon observing it under the microscope we perceive at once a multitude of microbes. This is because in the muscles the microbes are lodged between the fibrillæ and in the substance which surrounds them; and in the brain they are found in the interior of the nerve-cells, which must first be destroyed by trituration in order that their parasitic hosts may become visible."

I would say in the first place that the description above given of the *cryptococcus xanthogenicus* does not correspond with the characters of the micro-organism which Dr. Friere presented to me as his yellow-fever germ; and, secondly, that no such organism as he has described, or as was present in the cultures which he gave me, is to be found in the blood or tissues of yellow-fever patients.

The remarkable account of the morphology of his cryptococcus, which Dr. Friere has given on different pages of his principal work, has been pointed out by one of his medical confrères in Rio, in the following language:

In the second part of the order of the day the subject discussed was the etiology of yellow fever. After a brief exordium, Dr. Arango Góes said that there are two parasites which are presented as factors of the yellow fever, the *cryptococcus xanthogenicus* of Dr. Friere and the *peronospora lutea* of Dr. Carmona, of Mexico.

He wished in the first place to make the Academy acquainted with the *Cryptococcus xanthogenicus*. It is an alga to which has been given the specific title of *xanthogenic*. As to its appearance, he would quote Dr. Freire's own description, which is as follows: Page 11 of his work: Round, green cells, with a black border. Page 12: Round and gray, with a black ring, large and small. Page 12: Large, black, round corpuscles, brown cells. Page 13: Black or gray corpuscles. Page 13: Corpuscles of the size of grains of sand, or pin-heads, larger gray organisms with *green and red tints, others with a dark or black border*, and with bright spots in the center vividly reflecting the light. Page 14: Spherical corpuscles, with black borders. Page 15: Cells of considerable size, somewhat elongated or ellipsoid, with granulations. Page 25: Small black points, round cells, brown or black, vividly reflecting the light, iridescent, granular, with yellow and *green* pigments. Page 26: Ovoid or elliptical. Page 39: Green with dark borders, black. Page 40: Series of very fine black points; other spots larger and surrounded with dark borders; others still larger, of a greenish appearance, with changeable tints; others large, encircled in a dark belt with a bright spot in the center. Page 42: Large green cells with changeable tints; others very small and bright in the center, encircled in a dark belt. Page 43: Round corpuscles resembling small grains; others larger with a bright spot in the center. Page 44: Black borders encircling a bright spot; others resembling a bunch of grapes. Page 77, a rosary of round corpuscles with green tints. Page 81: *Cryptococci* red in the center, with a green border, others brown. Page 84: Green, with changeable tints and with the shape of a triangular pyramid. Page 85: Long mycellia with ramified spores. Page 86: Pyramidical bodies, bright and yellow. Page 79: Black corpuscles, others larger and brown, many of them with bright red borders, there being one conspicuous for its beauty, a red pyriform corpuscle with green borders. Page 226: Black spots, roundish corpuscles vividly reflecting the light, either brown or black or with black borders. Going back to 1883 (*Études Expérimentales sur la Contagion de la Fièvre Jaune*), we see that the *cryptococcus* is elongated and ramified, like the mushroom on being brought into contact with air, or like the *bacteria* of the carbuncle or the *mycoderma cererisæ*. Preface JJ, page 2: Transparent granulations inclosed in a covering containing yellow pigment. Page 12: Black granulations. Going back still farther, to the year 1880 (*Travaux Chimiques*), we see new forms. Page 225: Smoke-colored cells. Page 228: *Cryptococci* of variable sizes, some enormous with a bright space in the center, gray with a dark yellow segment, angular with an irregular polyhedric shape, fringed, without bright spots or segmental penumbra. Page 231: Granular *cryptococci* (*antheridia* and *sporangia*). This multiplicity of forms indicates that Dr. Friere has taken for *cryptococci* blood and fat globules and various mucid productions (mildew).

The speaker compared two more extracts from Dr. Freire's works with paragraphs in the "Archives of Physiology," showing that the *cryptococcus xanthogenicus* and the transformed blood globules and hematoblasts are perfectly alike.

In answer to a remark relating to the difference between microbes and the elements of the blood in regard to the power of motion, the speaker said that the capillary currents between two glass plates produce a perfect imitation of animated motion.

"In order to observe the microbes in the muscles, nervous centers and kidneys," says Dr. Freire, it is necessary to "examine with the microscope distilled water in which these organs have been triturated. In this way, and in this way only, myriads of microbes may be seen. In no other way would it be possible to discover them, for the microgerms are inclosed in the sarcolemma of the muscular fibers, in the nerve cells, and in I know not what element of the kidneys."

Making some reflections on this, the speaker observed that, if the shreds of the fibrille may be distinctly seen through the sarcolemma, still more plainly visible should be the *cryptococci* which attain large proportions—eight thousandths of a millimeter, and even ten times larger, as is stated by the author of the Etiology of Yellow Fever.

If Dr. Freire could not see the microbe through the transparent sarcolemma and nerve cells, it is because it was not there to be seen. If, after triturating the viscera he saw it, it is because the trituration separated the fat globules, and he took these for *cryptococci*. And so indisputable is this that Dr. Freire, referring to the liver, says: "Here we dispense with the preliminary process of trituration; it suffices to place a piece of liver between two plates and press them together, and innumerable microbes will be seen." (Page 6.)

Indeed, such must necessarily be the case, for the fatty degeneration of the hepatic gland furnishes a large quantity of fat globules without any necessity for triturating the tissues. The speaker added that what he had said on this subject was not mere theory, but the result of experiments made during three years. Tens of times he had seen the fat globules of the liver which are classified as microbes by Dr. Freire. A little ether or osmic acid would suffice to settle the question.

If Dr. Freire wished to show that micro-organisms were to be found in the viscera,

he should make use of the *only* scientific method of doing this. He should make histological sections, and thus he could indisputably prove the existence of his *cryptococcus* in the muscles, liver, kidneys, etc.

In his book, however, there is not a single engraving having any reference to this capital point, and this omission is unpardonable.*

It being late, the speaker here terminated his address, promising to continue on the following Tuesday.

The only explanation of this wonderful versatility as to form and color on the part of the "cryptococcus" which I can conceive of is that offered by Dr. Góes, viz: that Dr. Freire has mistaken deformed blood corpuscles, fat globules from the liver, and the débris of tissue elements in his trituration of muscle, brain, etc., for micro-organisms. Indeed, it can scarcely be doubted that such is the case, for, as I shall show later, exact methods of research show that no micro-organisms are present in such material, collected with proper precautions immediately after the death of a yellow-fever patient. Dr. Freire frequently speaks of his *cryptococcus* as being endowed with active movement. It is well known to microscopists that minute particles, organic or inorganic, when suspended in a fluid, undergo, under certain circumstances, a rapid vibratory motion, known as the brownian or molecular movement. The micro-organism, a micrococcus, which Dr. Freire presented to me as his yellow-fever germ, like other similar organisms, presents these molecular movements when suspended in a fluid, but it has no proper vital movements, such as are manifested by many of the bacilli. The fat drops from crushed liver tissue, or the débris of muscle fibrillæ, present these molecular movements, and in form and appearance present some resemblance to micrococci. They are easily distinguished, however, by chemical tests and staining agents. I may remark here that prior to his visit to Paris in 1887 Dr. Freire seems not to have made use of the method of staining with aniline dyes. In an address, made while in Paris, he defends himself from the charge which some one seems to have made, that he had neglected this means of recognizing micro-organisms, in the following language:

"We know that in order to color a microbe it is necessary, first, to kill it and then to wash the little microscopic cadaver by means of reagents possessing the power of dissolving all matters foreign to its skeleton. At the outset I applied myself to the study of the yellow fever microbe in a fresh state. I fed it with the best food—*les meilleurs engrais*—for the purpose of witnessing the different phases of its evolution from its birth to its death.

"Nevertheless, in fault of other accusations, some authors have reproached me with not having colored my microbe. Alas, what a miserable objection? Is it necessary in order to affirm the existence of a microbe, which swarms by millions in the urine, in the bile, in the blood, in the tissues, etc.—is it necessary to mask them, to disguise them under a costume of carnival, in order to please certain microscopists? M. Pasteur has never colored his microbes; and nevertheless every one admits the existence of the bacillus of charbon, of the corpuscles of pébrine, of the micrococcus of fowl-cholera, etc. * * * Do not think, gentlemen, that I fear the application of coloring processes to the search for the microbe of yellow fever. Far from it. In order to show you that the criticism which I have just made is not due to prejudice, I will say to you that such processes have recently been employed upon the yellow-fever microbe with complete success."

The method of cultivating in solid media and of isolating micro-organisms by means of plate cultures or Esmarch tubes, seems also to have been unknown to Freire prior to his visit to Paris. All of the cultures left in his laboratory at the time of my arrival were in liquid media and preserved in Pasteur flasks. He brought from Paris, however, a number of cultures in agar-agar, and among them one which he presented to me as a pure culture of his yellow-fever microbe. This was a micrococcus, which

* Dr. Góes, himself, has made numerous histological sections of the organs chiefly involved.

* *Répertoire Universel de Médecine Dosimétrique*. May, 1887, p. 224.

multiples, as do other micro-organisms of the same class, by binary division, and not by the growth of the separate cells to comparatively large dimensions, and the formation of endogenous spores, which are released by rupture of the cell wall of the mother cell. The latter mode of development is that which Freire has constantly assigned to his *Cryptococcus xanthogenicus*. In his address before the *Dosimétrique* Society of Paris, on the 2d of April, 1887, from which I have already quoted, he says:

"Each adult cell is ruptured in one or several points and allows to escape its contents, composed of germs which are to perpetuate the species and two pigments, one yellow, destined to infiltrate all the tissues and to produce the icteric color which has given name to the malady, the other black, insoluble, and destined to be carried along by the circulatory current, producing either capillary obstructions, or blood stasis in the parenchyma of the organs."

Now this mode of multiplication is not known among the bacteria, and does not occur in the micrococci which Dr. Freire placed in my hands as his yellow fever microbe. Fig. 1 is carefully drawn from a stained preparation, mounted in the usual manner from an agar-agar culture of this micrococcus, brought by Dr. Freire from Paris. This culture, according to Dr. Freire's statement to me, came originally from the blood of a yellow-fever patient at the point of death.*



FIG. 1.—Micrococcus of Freire. Culture brought from Paris in 1887, and presented to the writer as the microbe of yellow fever. Drawn from a preparation made in Dr. Freire's laboratory. $\times 1,000$.

Dr. Freire's method of obtaining his "cryptococcus" from black vomit is shown by the following quotation from his principal work:

"Culture from black vomit in bouillon.—The microbe was sowed on the 28th of March. At the end of five days, that is to say, April 2, we proceeded to examine this culture. There was no putrefactive odor and the liquid was perfectly well preserved. A drop quickly withdrawn showed us under a magnifying power of 740 diameters the following: Numerous black corpuscles; others larger, having the size of a pin's head; others much larger, of a gray color more or less pronounced, endowed with spontaneous movements. In a great many, one perceived a brilliant red border. In the midst of all these cryptococci one was distinguished by its beauty; it was a red corpuscle with a green border, pyriform, which was narrowly attached to an archipelago of granulations; it was a cryptococcus which threw out its contents

* I have had this micrococcus in cultivation ever since my return from Brazil. It is a staphylococcus which liquifies gelatine rather slowly, and which forms a white mass upon the surface of agar-agar, or of cooked potato. It does not produce black pigment and it is not present in the blood and tissues of yellow-fever cadavers. I have now made cultures from blood obtained from the heart, and material from the liver and kidney, in numerous cases occurring in the wards of the hospitals of Havana during the summer of 1888 and 1889, and I have not in a single instance encountered this micrococcus, or any micro-organism corresponding with Dr. Freire's description of his *Cryptococcus xanthogenicus*.

BALTIMORE, September 20, 1889,

of spores and pigment. It is known that in the vomited matter conditions are found favorable for the developement of different germs. It is for this reason that one sees in this culture numerous bacteria, pre-existing in the vomited matter, endowed with movement, in the form of filaments more or less long and slender like ribbons, transparent, isolated or joined in pairs. At this moment one observes four bacteria articulated, forming a single mobile filament, resembling a fragment of chain of a tenia or of a *bothriocephale*. In a great number of points the bacteria were interlaced, forming a vast net-work resembling sometimes fine lace. It is well established that they constitute a matter foreign to the culture of the *Cryptococcus xanthogenicus*; these productions never appear in a pure culture. What is equally interesting is that finally, according as the cryptococcus gains ground, the bacteria have a tendency to disappear, even completely. Indeed, in this same culture, examined five months after, no traces of bacteria were discovered, as may be seen in the accompanying drawing."

This method of obtaining a pure culture is quite a novel one, and judging from the cultures which I examined in Dr. Freire's laboratory, is far from being reliable. Soon after my arrival in Rio, Dr. Freire's assistant, Dr. Chapot Prévost, selected for me a culture from a closet in the laboratory, devoted to the preservation of his yellow-fever cultures. These cultures were all in Pasteur flasks, and the neck of each flask was carefully wound with cotton-wool, to prevent the admission of atmospheric organisms through the ground joint by which access to the flask is obtained. Direct examination of the contents of this flask showed that it contained various organisms, but none resembling the *Cryptococcus xanthogenicus*. I made cultures in agar, in bouillon, and in gelatine from this flask, which was labelled February 13, 1885, and obtained in these cultures a variety of different bacilli, some of which I isolated by means of Esmarch tubes; among these was a small oval bacillus with end staining, resembling somewhat the bacillus of rabbit septicæmia; a slender, straight bacillus with square ends, and a larger bacillus, also with square ends articulated in chains of two or more elements. After Dr. Freire's return (July 14), he placed in my hands another of these flasks dated February 26, 1885, which he said contained a culture originally started from the blood of a fatal case of yellow fever, shortly before death. Direct examination of preparations stained with fuchsin showed that this culture contained at least two species of bacillus, but no micrococci were recognized.

It seems evident from these examinations of Dr. Freire's cultures that his statement that in impure cultures his cryptococcus obtains the mastery over other micro-organisms and remains in possession of the field can scarcely be accepted.

No doubt Dr. Freire has had micrococci in abundance in his cultures made from black vomit, and possibly his cultures from this source may have contained the veritable yellow-fever germ, but it will be conceded by all bacteriologists that by the methods he details it would be quite impossible to demonstrate the fact, if such were the case. As he has said, black vomit contains a variety of micro-organisms, and, as I can affirm from my own observations, among the number there are micrococci of several different species. To demonstrate that any of these is the cause of yellow fever it would be necessary to isolate it in pure cultures, and prove its specific pathogenic power by inoculations in man or in one of the lower animals. This, Dr. Freire has entirely failed to do. As to the micrococci of various shapes and colors, which he has described in the foregoing quotation from his work, it is evident that his account is founded entirely upon a misinterpretation of what he saw under the microscope. It is the testimony of numerous competent observers that the peculiar color of black vomit is due to the presence of blood which has escaped by passive hemorrhage from the mucous membrane of the stomach. I have verified this fact by microscopic examination, and have in my possession a photo-micrograph, made in Havana

in 1879, which shows it in a most convincing manner. This was made from black vomit, mounted *au naturel*, and shows numerous pale disks, which are evidently decolorized red blood corpuscles, scattered about the field, or agglomerated in little masses. The same photograph shows numerous micrococci and a few bacilli. I have recently examined a large number of stained sections of the stomach from four typical cases of yellow fever, and I find attached to the surface of the mucous membrane various micro-organisms, which I shall describe in detail later. Among these are micrococci, and in some preparations vast numbers of these are massed together upon the surface of the mucous membrane. But these do not correspond either with the *Cryptococcus xanthogenicus*, as described by Dr. Freire, or with the figure which he has given of his culture from black vomit. Whether these micrococci, or any other of the various micro-organisms found in the stomach and intestines of yellow-fever patients are concerned in the etiology of yellow fever, can only be determined by an extended experimental research, in which all of the modern methods for isolating micro-organisms and testing their pathogenic power must be brought into use.

Having demonstrated that the micrococcus presented to me by Dr. Freire as his yellow-fever microbe does not correspond with his descriptions of the *Cryptococcus xanthogenicus*, I shall proceed to make good my second assertion, viz. that *no such organism as he has described, or as was present in the cultures which he gave me, is to be found in the blood or tissues of yellow-fever patients.*

I remark, first, that his micrococcus would be very easy to demonstrate in properly stained preparations of blood or sections of tissues; second, that I have made a multitude of such preparations, but have never encountered it. I would further remark that I have faithfully searched, without any prejudice against the finding of a yellow-fever germ in the blood or tissues, but that on the contrary at the outset of my researches I felt quite sanguine that such a germ would be found when properly looked for. I have long been of the opinion that there must be a micro-organism of some kind concerned in the etiology of yellow fever, and as long ago as 1873 sustained this view in a paper published in the American Journal of the Medical Sciences (April, 1873). Naturally in an infectious disease, in which the liver and kidneys show the most marked pathological changes, we would expect to find the agent which is the cause of the disease, and upon which its infectious nature depends, in the blood or in the parenchyma of the affected organs. Accordingly, I have from the outset of my investigations given special attention to a search for the yellow-fever germ in the blood and tissues of yellow-fever cases.

RESEARCHES BY THE WRITER.

[Extracts from report of Havana commission (1879).]

In Havana Dr. Sternberg gave a large share of his time to the microscopic examination and photography of the blood. No chemical examination was attempted. The patients from whom specimens of blood were obtained were mostly soldiers in the military hospital of San Ambrosio. Ninety-eight specimens from forty-one undoubted cases of yellow fever were carefully studied, and one hundred and five photographic negatives were made, which show satisfactorily everything demonstrable by the microscope. These photographs were mostly made with a magnifying power of 1,450 diameters, obtained by the use of Zeiss's one-eighteenth inch objective and Tolles's amplifier. Probably no better lens than the Zeiss one-eighteenth (oil-immersion) could have been obtained for this work, and it is doubtful whether any objective has ever been made capable of showing more than is revealed by this magnificent lens. With the power used, organisms much smaller than those described as existing in the blood of charbon or of relapsing fever would be clearly defined.

If there is any organism in the blood of yellow fever demonstrable by the highest powers of the microscope as at present perfected, the photo-micrographs taken in Havana should show it. *No such organism is shown in any preparation photographed immediately after collection.* But in certain specimens, kept under observation in culture-cells, hyphomycetous fungi and spherical bacteria made their appearance after an interval of from one to seven days. The appearance of these organisms was, however, exceptional, and in several specimens, taken from the same individual at the

same time, it occurred that in one or two a certain fungus made its appearance and in others it did not. This fact shows that the method employed can not be depended upon for the exclusion of atmospheric germs, but does not affect the value of the result in the considerable number of instances in which no development of organisms occurred in culture-cells in which blood, in a moist state, was kept under daily observation for a week or more.

The method employed seemed the only one practicable for obtaining blood from a large number of individuals without inflicting unwarrantable pain and disturbance upon the sick. It was as follows: One of the patient's fingers was carefully washed with a wet towel (wet sometimes with alcohol and at others with water) and a puncture was made just back of the matrix of the nail with a small triangular-pointed trocar. As quickly as possible a number of thin glass covers were applied to the drop of blood which flowed, and these were then inverted over shallow cells in clean glass slips, being attached usually by a circle of white zinc cement. In dry preparations, which are most suitable for photography, the small drop of blood was spread upon the thin glass cover by means of the end of a glass slip.

The thin glass covers were taken from a bottle of alcohol and cleaned immediately before using, and usually the glass slips were heated shortly before applying the covers, for the purpose of destroying any atmospheric germs which might have lodged upon them. These precautions were not, however, sufficient to prevent the inoculation of certain specimens by germs floating in the atmosphere (*Penicillium* spores and micrococci); and in nearly every specimen the presence of epithelial cells, and occasionally of a fiber of cotton or linen, gave evidence that under the circumstances such contamination was unavoidable. It is therefore believed that any organism developing in the blood of yellow fever, or of other diseases, collected by the method described, or by any similar method, can have no great significance unless it is found to develop as a rule (not occasionally) in the blood of patients suffering from the disease in question, and is proved by comparative tests not to develop in the blood of healthy individuals, obtained at the same time and by the same method.

Tried by this test it must be admitted that certain fungi and groups of micrococci, shown in photographs taken from specimens of yellow-fever blood collected at the military hospital and preserved in culture-cells, can not reasonably be supposed to be peculiar to or to have any causal relation to this disease.

During my recent visit to Brazil and Mexico I repeated my examinations of blood drawn from the finger of yellow-fever patients, and with the same negative result which had attended similar researches in Havana in 1879. The blood was spread in a thin layer upon clean slides, at the bedside of the patient, allowed to dry at once, and subsequently examined with a DD dry lens and a one-eighteenth inch homogeneous oil-immersion objective of Zeiss. The blood was fixed by heat or osmic acid, and stained with various aniline colors, including methylene-blue, fuchsin, and methyl-violet, all of which colors promptly stain the micrococcus of Freire and similar organisms. I brought back with me numerous slides stained in this way, including some in which the red corpuscles were stained with eosine. The nuclei of the white corpuscles stained by the aniline colors are well brought out, but no micrococci or other bacteria are to be seen in any of these preparations. The following is a record of the cases from which blood was taken for examination in this way:

June 7.—Collected blood from finger in two cases of yellow fever in the Misericordia hospital (Rio de Janeiro). One a Portuguese, an attendant in the hospital, three months in Brazil, in the first day of sickness; the other in the fourth day. Both had highly albuminous urine, and the diagnosis of yellow fever has been made by the house physician. I found them in an isolated ward, from which they were soon after sent to the small-pox hospital, where one of them died.

June 26.—Collected blood from finger of yellow-fever patient in the small-pox hospital; third day of sickness. The patient has highly albuminous urine, and ejected black vomit in my presence. Died the next day.

July 2.—Dr. Araujo Góes, who had assisted me in collecting blood from the above cases, took blood by the same method from the finger of a yellow-fever patient in the small-pox hospital in the sixth day of sickness; a fatal case.

Veracruz, September 28, 1887.—Took blood from finger of two patients just admitted to the civil hospital with fever. No parasites of Laveran found on examination of fluid and of stained preparations. One of these cases seen the following day had al-

buminous urine, a sub-normal temperature, and a feeble pulse of 40 per minute; the surface was cool and moist—second stage of yellow fever. The other also was found without fever; had a slow pulse, a trace of albumen in the urine, and seemed to be convalescent—a mild case of yellow fever.

October 4.—Took blood from case of yellow fever in civil hospital, second day of sickness. October 5.—Took blood from same case.

Blood was subsequently examined from two typical cases in the military hospital. The result of all of these examinations, as heretofore stated, was entirely negative, so far as the presence of micro-organisms was concerned.

CULTURE EXPERIMENTS.

The following culture experiments were made with blood drawn from the finger from the four cases above recorded as coming under my observation during my stay in Rio:

In every case the finger was carefully washed, first with a solution of corrosive sublimate of 1 to 1,000, and then with stroug alcohol, to remove every trace of the sublimate solution. The puncture was made with a sterilized needle in the palmer surface of the finger near its extremity, and the blood was collected as quickly as possible in little glass tubes with an expanded bulb. A free flow from the puncture was obtained by means of a ligature around the finger, or by pressure applied by the hand. Each capillary glass tube was hermetically sealed in the flame of an alcohol lamp as soon as it was charged with a little drop of blood. The tubes were subsequently taken to the laboratory and the contents used to inoculate the various culture media employed.

July 7.—Blood collected from two typical cases of yellow fever in the Mesericordia Hospital, one in the first day of sickness, the other in the fourth day. From the capillary tubes filled at the bedside I made the following inoculations from each case, viz, two bouillon tubes, two gelatine tubes, one agar-agar tube. June 10.—One gelatine tube contains a bacillus, one bouillon tube a micrococcus and actively moving bacilli (vibrios). Another bouillon tube was subsequently found to contain a micrococcus, and at a later date a bacillus also. These micrococci were grouped in tetrads, and did not correspond with the micrococcus of Freire. The remaining tubes remained sterile, viz, two of bouillon, three of gelatine, and two of agar.

June 26.—Collected blood from finger of patient with yellow fever third day of sickness, in the small-pox hospital; a typical case; had highly albuminous urine, and ejected black vomit in my presence. Inoculated at the bedside two bouillon tubes, and at the laboratory six tubes of agar-agar—all of these were placed in an incubating oven (étuve d'Arsonval) in the physiological laboratory at the Museum of Natural History. One bouillon tube "broke down" with the bacteria of putrefaction; the other bouillon tube and the six agar tubes remained sterile.

July 2.—Dr. Araujo Góes, who had assisted me in my previous experiments, collected and brought to the laboratory in capillary tubes blood from a typical case of yellow fever in the small-pox hospital—sixth day of sickness. From these capillary tubes I inoculated three tubes of bouillon and three of agar. In one of the bouillon tubes a large micrococcus in tetrads was developed, and the same large micrococcus*

* The large micrococcus referred to corresponds with the *Tetragenus febris flavæ* of Dr. Carlos Finlay, of Havana, and is very different from the micrococcus presented to me by Dr. Freire as his yellow-fever microbe. I have named it *Micrococcus tetragenus versitilis*, and will give a full account of it in my final report. It is sufficient to say at present that my recent extended researches in Havana show that it is very common on the surface of the body of patients in the hospital wards in Havana, and that it is not found in cultures made from the blood and tissues when proper precautions are taken to exclude the possibility of contamination by extraneous organisms.

associated with a small diplococcus in one of the agar tubes. The other tubes—two bouillon, and two agar—remained sterile.

Vera Cruz, October 12.—Took blood from finger of typical case of yellow fever in military hospital; fourth day of sickness; temperature, 40.5°; urine, albuminous; eyes, yellow. Blood collected in capillary tubes and inoculated at laboratory into five tubes of bouillon, two of gelatine, and three of agar. *October 13.*—Two more agar tubes inoculated with blood from finger of above case. Result: No development of micro-organisms in any of these culture tubes.

It will be seen that the micrococcus of Freire did not develop in any of the tubes inoculated with blood from the finger of five typical cases of yellow fever, and that out of a total of thirty-four culture tubes inoculated twenty-eight remained sterile, while various organisms appeared in six. My inference from these experiments is that the bacilli and micrococci found in these six tubes were present as a result of accidental contamination of the blood drawn, either by organisms on the surface not destroyed by the disinfecting process or by floating atmospheric organisms, attached, perhaps, to epithelial cells or minute particles of wool, etc., which are extremely abundant in hospital wards. This inference is supported by the negative result which attended my direct examination of blood from the same source, and by culture experiments made in Vera Cruz, which show that micro-organisms of the kind encountered are extremely common on the surface of the body of patients in hospital.

The supposition that the micro-organisms present in Dr. Freire's blood-cultures and in those of various other observers who have discovered yellow-fever "germs" came from the surface of the body and not from the blood is sustained by recent experimental researches upon the sterilization of the hands, made by Kimmell* and by Fürbringer.†

These experiments show that it is not an easy matter to destroy all micro-organisms upon the surface of the body by means of a disinfecting solution, and that a simple washing with bichloride solution of one to one thousand does not usually insure sterilization of the hands. Fürbringer, after repeated experiments, recommends the following procedure: (1) Remove all visible dirt from the nails; (2) scrub the hands with soap and water by means of a brush; (3) immerse them for one minute in strong alcohol, at least 80 per cent.; (4) while still wet immerse them for one minute in a 2 per cent. solution of mercuric chloride.

Less thorough treatment did not in Fürbringer's experiments absolutely insure sterilization. In the case of patients in hospital, the difficulty is often increased by the fact that their hands are horny and begrimed with dirt, which can only be removed by long scrubbing.

A character upon which Dr. Freire insists, even in his address delivered in Paris in April, 1887, is the formation of two kinds of pigment, one yellow and one black. From the first he has affirmed that the black color of the characteristic "black vomit" is not due to the presence of blood changed by the acid secretions of the stomach, as has been generally believed by those physicians who have studied the disease, but that this color is due to a pigment produced by his cryptococcus. Now, I have had the coccus which he gave as his yellow-fever germ under cultivation in various media, during a period of several months, and no black pigment has been produced. On the contrary, the colonies in Esmarch tubes, and stick cultures in gelatine, or in agar all have a milk-white color.‡

* Wie soll der Arzt seine Hände Desinfectiren? Deutsche med. Wochenschr., 1886, No. 32, p. 555.

† Untersuchungen und Vorschriften über Disinfection der Hände des Arztes, etc. Wiesbaden, 1883.

‡ BALTIMORE, September 20, 1889.

I have repeatedly demonstrated the fact that the colored flocculi which are in suspension in "black vomit" and give to it its characteristic appearance are made

EXPERIMENTS OF DR. DANIEL RUIZ.

If the infectious agent in yellow fever is present in the blood, we would expect that the disease may be transmitted by inoculating a susceptible person with blood drawn from one sick with the disease. Dr. Finlay, of Havana, believes that the disease is commonly transmitted by mosquitoes, which, after filling themselves from a yellow fever patient, transmit the germ by inoculation into susceptible persons. Evidently the most satisfactory and direct way of determining whether the infectious agent is present in the blood would be to make inoculation experiments in susceptible persons. Before going to Brazil I had considered the possibility of making this crucial experiment, and had determined to make it if opportunity offered. When in Vera Cruz I learned that the experiment had already been made in 1885 by Dr. Daniel Ruiz, director of the civil hospital in that city. Dr. Ruiz is an entire unbeliever in the infectious nature of yellow fever, and had no confidence in the alleged discovery of a yellow fever germ by Dr. Carmona, of the City of Mexico. In order to test, in a practical manner, the truth of his views, he made, in 1885, injections of blood and of urine from typical cases of yellow fever, into the subcutaneous connective tissue of an "unacclimated" person. The result of these inoculations was negative. At the time of my visit to Vera Cruz he expressed his entire willingness to repeat these experiments in my presence. This was exactly what I desired, and accordingly Dr. Ruiz made three inoculation experiments upon three unacclimated persons in the hospital. Unfortunately, the blood used for two of these individuals was obtained from a case in which the pathological appearances did not fully sustain the diagnosis of yellow fever made during life. This case is one of great interest with reference to the question of diagnosis, and I shall give a tolerably full account of it. The third inoculation was made from a non-fatal case in the eighth day of sickness; urine still albuminous; skin yellow. Fifty cubic centimeters of blood was drawn from the median vein of this patient by means of a hypodermic syringe, which had been care-

up of decolorized blood corpuscles; and that the dark color of the fluid is due to a brownish pigment which, without doubt, is altered blood pigment. But inasmuch as this fact is denied by Dr. Freire on the ground that he has failed to obtain the spectrum which characterizes blood pigment, I have thought it best to have a spectroscopic examination made by an expert in researches of this kind. With this view I collected black vomit last summer (1888), in Havana, from a number of typical cases, and placed the material in the hands of Dr. George T. Kemp, Ph. D., of Johns Hopkins University, now of the Hoagland Laboratory, Brooklyn, N. Y. Dr. Kemp has given me the following account of the result of his spectroscopic examination:

BROOKLYN, N. Y., March 4, 1889.

MY DEAR DOCTOR: After your departure, I opened the bottles containing the black vomit collected by you last June. The vomit was much decomposed, but in spite of this decomposition the masses of partly decolorized red blood corpuscles could still be made out. A spectroscopical examination proved the existence of blood pigment beyond a shadow of doubt! The reaction of the vomit was strongly *alkaline* from fermentation, and the vomit, untouched by any chemical reagent, gave the spectrum of *alkaline hæmatin*. Boiling this with acetic acid gave the spectrum of *acid hæmatin*, and treating the vomit with Stokes' fluid and ammonia gave the characteristic beautiful bands of *Hæmochromogen* (Stokes' Reduced Hæmatin). These are the characteristic spectra which one would expect to obtain from decomposed blood, and prove, beyond all question, the presence of blood pigment in the vomit.

These observations agree with those of Dantec, except in one point, viz, that he found the pigment in the condition of hæmaglobin or methæmaglobin. There is not the slightest contradiction here, for he examined the vomit fresh, while the specimens at my disposal had undergone alkaline decomposition, and this process *should* change the hæmaglobin or methæmaglobin found by him into the alkaline hæmatin found by me. Our observations, therefore, are entirely in accord. I only examined the specimens taken from the *stomach*; the specimens of dark colored material from the intestine I shall examine later.

fully sterilized. This was immediately after injected, subcutaneously, in the deltoid region, into the arm of a man aged forty, from the interior of Mexico, who had been in Vera Cruz only twenty days. The man from whom the blood was taken was apyretic, and the experiment is open to the criticism that it was perhaps too long after the inception of the malady. I was, therefore, anxious to make other experiments before leaving Vera Cruz, but the time fixed by my orders expired without my having had an opportunity to do so.

The case in which the autopsy did not sustain the diagnosis was No. 122 in the civil hospital. I quote from my notes as follows:

"Estivan Peris, aged twenty-nine years, three years in Vera Cruz. Taken sick October 1 at 3 o'clock in the afternoon; admitted to hospital October 4, 7 a. m.; conjunctivæ injected; pain on pressure in epigastric region, urine albuminous. Temperature at 5 p. m. 40.6° C. (105.1° F.); no chill at outset; pain in head and limbs.

"October 5, 7 a. m.—Temperature 40.4° C. (104.7° F.); pulse 144. 5 p. m. temperature 38.6° C. (101.7° F.); pulse 136; vomited at 2.30 and at 4.30 a clear acid liquid; urine acid, albuminous. Diagnosis by director of hospital, 'yellow fever.' At this visit (5 p. m., October 5) blood was obtained by cupping from the epigastric region, and of this 40 cubic centimeters was injected into the arm—deltoid region—of a young Spaniard who has been in Vera Cruz about a year and has never had yellow fever. At the same time blood was collected from the finger of the patient and inoculated into four tubes of bouillon and three tubes of agar-agar." There was no development in any of these tubes.

"October 6, 7 a. m.—Temperature 38.7° C. (101.6° F.); pulse 116; urine still albuminous. 6 p. m. temperature 40.7° C. (105.2° F.); pulse 120; pain on pressure over epigastrium and kidneys; conjunctivæ injected; great mental torpidity, hesitation in answering questions; nausea, but no vomiting."

NOTE.—Up to this time the case presented the appearance, and had the history of a case of yellow fever, and I fully concurred in the diagnosis of Dr. Ruiz, director of the hospital.

"October 7, 7 a. m.—Temperature 38.1° C. (100.5° F.); pulse 144; respirations 52 per minute; has strabismus and tonic contractions of the flexor muscles of the arms; conjunctivæ injected and yellow; paralysis of the bladder. A large amount of albuminous urine drawn from bladder by means of the catheter."

NOTE.—The rapid pulse and free secretion of urine are not common in yellow fever at this stage, neither is mental hebetude, in the absence of suppression, or strabismus, and tonic contractions of the muscles met with in my experience. The fall of temperature on the 5th, lasting until the morning of the 6th, and supposed to be that commonly encountered in yellow fever—stage of calm—was followed by an evening exacerbation on the 6th, and a morning remission on the 7th, which gives to the pyrexia a remittent character.

"October 7, 5 p. m.—Strabismus and contraction of flexor muscles more pronounced, hiccough; ineffectual efforts to vomit; does not respond to questions; a large quantity of urine again drawn from bladder—not albuminous—contains granular tube casts and epithelial cells from bladder. Temperature 37.6° C. (99.7° F.); pulse 120. At this visit (5 p. m., October 7) Dr. Ruiz drew from the median vein of the arm of this patient 50 cubic centimeters of blood by means of a hypodermatic syringe, and injected it immediately into the arm of a native of the interior, who had been but twenty days in Vera Cruz."

NOTE.—The result of the above mentioned inoculations was entirely negative.

"October 8, 7 a. m.—Temperature 39.3° C. (102.7° F.); pulse 120; a quantity of urine again drawn from bladder; symptoms the same. 6 p. m. Skin cold and moist; unconscious.

"October 9.—Had convulsions during the night; died at 7 a. m. Temperature in axilla one-fourth hour after death 40.3° C. (104.5° F.)

"Necropsy at 7.30 a. m.—Conjunctivæ yellow; skin slightly yellow; temperature

between stomach and liver, ten minutes after opening cavity of the abdomen, above 42.6 C. (108.6 F.), which is the limit recorded by thermometer. There are newly-formed adhesions between the viscera in the cavity of the abdomen, and also between the pleural surfaces. The liver is very large, full of blood, and of a color darker than normal; upon its surface are hemorrhagic infarctions; gall-bladder full of viscid and dark-colored bile. The stomach contains a yellowish liquid, with brown flocculi, which, upon microscopic examination, prove to be made up of desquamated epithelium. Spleen very large, soft, and dark-colored, attached to other viscera by newly-formed adhesions. Pericardium contains 3 to 4 ounces of a yellow fluid." (A culture made from this fluid contains a micrococcus.) I regret that no examination of the intestine was made in this case to ascertain whether there was ulceration of the intestinal glands. At the autopsy I did not hesitate to express my belief that a mistake in diagnosis had been made, and that in my opinion the pathological appearances considered in connection with the clinical history seemed to favor the view that the case was one of bilious remittent fever. Dr. Ruiz, who has made many autopsies, was still of the opinion that the case was one of yellow fever, and stated that in a certain number of cases of this disease which had come under his observation pathological appearances were such as were presented in the case under consideration. A microscopical examination of the tissues, made in Baltimore, has not served to settle the question of diagnosis in a definite manner. The most striking thing encountered in sections of the kidney and liver is an enormous number of leucocytes in the capillary vessels. Dr. William Welch, professor of pathology in Johns Hopkins University, who has kindly looked at my sections, does not hesitate to pronounce the case one of leucocythemia. Under these circumstances it is evident I am obliged to exclude the inoculation experiments made with blood from this case, and also the culture experiments made with blood drawn during life and from the tissues immediately after death. These, however, have a certain interest, and I accordingly report them here.

At the autopsy I inoculated two agar-agar tubes with blood from the heart, two with material drawn with due precautions from the interior of the liver, two from the kidney, one from fluid in the pericardial sac. Two bouillon tubes with blood from the heart, and two with bile from the gall-bladder. Two days later (October 11) the two tubes from the kidney contained, one a bacillus resembling *B. termo*, and the other two species of micrococci. The tube inoculated from the pericardial fluid contained a large micrococcus in tetrads. One of the agar tubes from the liver contained a micrococcus and two bacilli. All of the tubes (two agar, two bouillon) inoculated with blood from the heart remained sterile.

As stated in the introduction to this report, I made preparations before leaving Baltimore to make extended researches, similar to those above reported, by inoculating various culture-media with material taken directly from the interior of the organs chiefly involved in the disease under consideration—especially from the liver and kidney. It was also my intention to make a biological analysis of the contents of the stomach, the intestines, and the bladder. But, unfortunately, the opportunity for carrying out this intention did not occur, and greatly to my disappointment the time allotted to the investigation with which I was charged expired without my having been able to carry out my plans in this particular.

EXAMINATION OF TISSUES.

In all infectious diseases which have been proved to be due to the presence of a parasitic micro-organism in the blood, this organism may be demonstrated in properly stained thin sections of the tissues. In such sections we often obtain cross-sections of small blood-vessels in which the blood corpuscles are *in situ*, and in which a stained micro-organism, if present, would be very apparent. We also have a satis-

factory view of the contents of the capillary vessels of the liver, kidney, brain, etc., in well-prepared sections of these organs. Pathologists, therefore, look upon a careful research, by the methods which have been perfected with this object in view, as of prime importance in any attempt to prove whether a given infectious disease depends upon the presence in the blood of a specific micro-organism. Moreover, in certain infectious diseases in which a parasitic micro-organism has been proved to be the essential etiological factor, this organism is not found, as a rule, in the general blood current, but is present in the tissues especially implicated in the morbid process, *e. g.*, in typhoid fever in the spleen and intestinal glands, in tuberculosis in the tubercular nodules in the lungs and elsewhere. Failure to find a parasitic organism in blood drawn from the finger is therefore not satisfactory evidence of the absence of a specific germ from the tissues of the organs involved.

As in yellow fever the liver and the kidneys give evidence of pathological changes resulting from the disease, I have naturally given special attention to these organs in the researches I have made.

Before recording the results of my own recent researches in this direction I desire to quote from the preliminary report of the Havana yellow-fever commission, submitted November 18, 1879.

Morbid anatomy and pathological histology.

In the division of labor made by the commission at the outset of the investigation this portion of the work was assigned to Dr. Guitéras, who reports as follows:

Twenty-two autopsies have been performed during the months of July, August, and September, 1879. Of these eighteen have furnished material for histological studies. All the post mortems but two were performed at the military hospital of San Ambrosia. The diagnosis of the disease was confirmed in every case by the attending physician, and frequently also by the director of the hospital. In this institution the material for the study of the morbid anatomy of yellow fever is amply sufficient. The commission has met with no obstacles in the discharge of its duties, both because of the favorable disposition of the physicians in charge and because of the absence of all fears of contamination on the part of the community.

Rather than conclusions, the statements presented in this report should be considered as suggestions brought forward by a preliminary examination which your committee expect to substantiate after further investigation.

The organs that have been prepared for examination are: The liver, stomach, and intestines, the kidney, the supra-renal body and the spleen, the spinal chord, the medulla oblongata, the meso-encephalon, the pneumogastric nerve, and the semilunar ganglion of the abdomen, the heart and other muscles, the mesenteric glands, and the lungs.

The tissues from fourteen of the cases are already cut and ready for mounting. Of the first eight cases a number of sections have been mounted (144) and accompany this report.

1. *The liver* has been found always to be of about the normal size and consistency. Its color in the majority of the cases light, the exceptions being one case of chronic cirrhosis and two cases in which the lungs were found studded with hemorrhagic foci. The lesion constantly found in the organ by microscopic examination is the so-called parenchymatous inflammation of Virchow. The hepatic cells are found in a condition of cloudy swelling. Besides the fine albuminous granulation, the cells show at times evidences of fatty degeneration and pigmentary infiltration. As in other cases of parenchymatous inflammation, here also the connective tissue is found to partake of the general nutritive change. It is swollen and presents some embryonal cells. This is very apparent in one case where the lesion occurs in a liver previously affected with chronic cirrhosis. In this case the adult connective tissue is abundantly infiltrated with young inflammatory tissue.

The larger biliary passages are found patulous throughout, and the smaller ducts present no evidences of catarrhal inflammation: so that if any obstruction exists in the latter it is due to the cloudy swelling of the hepatic cells and the interlobular connective tissue. It has been supposed that the jaundice may be due to diminished pressure in the portal circulation; yet, in spite of the depletion by hemorrhage from the portal radicles, the interlobular veins are found sometimes choked up with blood.

No microphytes have been found in the liver or in the blood contained in its vessels.

2. *The stomach* presents no evidence of inflammation. The protoplasm of the epithelial cells is normal, and the nuclei quite distinct. There is no degeneration of the

muscular coat. It is very difficult at first to find the source of the blood found in the black vomit. The reason is this: That the tops of the ridges between the gastric follicles are removed by post-mortem digestion, and it appears that the hemorrhages take place always, as far as I have seen, from the loops of capillaries that rise into these ridges. The post-mortem digestion removes therefore the hemorrhagic foci that could lead us to detect the points of hemorrhage. In some of the preparations, especially those stained with hematoxylin, where these tops remain, small hemorrhagic infarctions may be detected close under the free surface of the mucous membrane. In confirmation of this supposed action of post-mortem digestion may be mentioned the fact, which was to be expected, observed by Dr. Sternberg, that the black vomit examined ante mortem presents scarcely any cylindrical epithelium, while the fluid contained in the stomach after death is crowded with it.

3. *The kidney.*—No autopsy has been made before the third day of the disease. In all cases the epithelial cells are more or less in a state of cloudy swelling. Sometimes they seem to be large enough to obstruct the lumen of the tubules. In every kidney, however, some tubules are met with which appear to be in a normal condition. In some of them, on the contrary, there are evidences of catarrhal inflammation; some young cells are met with displacing the older ones, and some round cells are found between the tubules. Not infrequently yellow casts are encountered, choking up the caliber of the tube. The blood vessels, especially toward the cortex, are quite frequently distended with blood. Some of the tubules also contain masses of coagulated blood. *No organisms have been found in the kidney.*

4. *The heart.*—The examination of this organ shows that there is no foundation for the opinion that there is a fatty degeneration of the muscular fiber. The heart is almost always found firmly contracted, and its consistency and color are normal. The striations are always distinct and only in some of the fibers a few fatty granules are found in the neighborhood of the nuclei. The *rectus muscle* and the *diaphragm* are found in normal condition.

5. *The semi-lunar ganglion.*—Connective tissue of new formation is here met with to a greater extent than in the tissues heretofore described, but the nervous elements present no evidences of degeneration further than the cloudy swelling already described in other organs.

Of the other portions of the nervous system, which have not been examined microscopically, it may be said that they present nothing abnormal to the naked eye.

As the methods of staining employed by Dr. Guit  ras in Havana were not as satisfactory for the demonstration of micro-organisms as some which have since been devised, I have not considered our failure to find micro-organisms in sections of tissues mounted by him at that time as sufficient evidence of their absence. We could, however, scarcely have failed to see, by the methods used, a micrococcus like that which Freire presented to me in Rio as his yellow-fever germ, or anything like the micrococcus in tetrads which Dr. Finlay, of Havana, believes to be the specific cause of the disease.

Desiring to supplement the observations made in Havana, in 1879, by further researches, I wrote to my friend Dr. Daniel M. Burgess, of Havana, some time during the summer of 1884, requesting him to obtain for me small pieces of liver, kidney, and stomach, from one or more typical cases of yellow fever. I made it an essential condition that the autopsies should be made within an hour, or, at the outside, two hours after death, so that there might be no question of *post-mortem* changes. Small pieces of the organs named were to be put at once into a large quantity of strong alcohol. In compliance with my request, Dr. Burgess obtained and forwarded to me material from two cases which reached me in good condition, and, upon microscopic examination, the liver and kidneys showed the pathological changes constantly found in the disease in question. During the winter of 1884 I mounted numerous thin sections from this material, stained with various aniline colors. In none of them did I find any micro organisms, except upon the surface of the mucous membrane in sections of the stomach, where various organisms—bacilli and micrococci—were to be seen in properly stained sections. These were, however, only upon the surface, attached to the epithelium, or mingled with a granular debris adhering to the surface of the mucous membrane. In the autumn of 1885, during a visit to Dr. Koch's laboratory in Berlin, I had an opportunity to avail myself of the suggestions and valuable assistance of the Master in Bacteriology, and again studied the material which Dr. Burgess had

sent me from Havana, by the various methods of staining considered to be most useful in such a research. At the request of Dr. Koch I was assisted in this research by Dr. Carl Seitz, who was at the time engaged upon his studies of the typhoid bacillus, and was an expert in staining and mounting thin sections of the tissues. Dr. Seitz and myself examined numerous sections of liver and kidney stained by various methods, with an entirely negative result so far as the presence of micro-organisms was concerned. After my return to Baltimore, in 1886, I again made numerous sections from the same material, and stained them with Loeffler's alkaline solution of methylene blue, which we had also used in Dr. Koch's laboratory, and with other aniline colors, but without any better success.

Desiring to repeat these researches upon fresh material, I wrote to my friend Dr. Burgess, during my stay in Rio (June and July, 1887), requesting him again to collect pathological material for me from at least four cases of yellow fever, so that after my return to Baltimore I might continue these investigations. As before, this material was to be obtained as soon as possible after death, and to be put at once in strong alcohol. About the 1st of December I received from Dr. Burgess the desired material in good condition, together with the following letter:

HAVANA, November 19, 1887.

MY DEAR DOCTOR: I send you, per Dr. Spore, of *City of Washington*, which sails to-day, one box of pathological specimens. * * * You can rely implicitly upon the specimens having been taken from well-diagnosed yellow-fever cases, at the time *post-mortem* stated on the bottles. All had, besides the proper temperature curve, irritable stomach, black vomit, highly albuminous urine, eventually in most cases suppression of urine, etc. I saw them repeatedly.

The bottles were marked as follows:

Case No. 1.—Sick from August 14 to 19, 1887. Autopsy one hour after death.

Case No. 2.—Died September 23, 1887, at 4.30 a. m. Autopsy two and one-half hours after death.

Case No. 3.—Died October 5, 1887, 2.30 a. m. Autopsy fifteen minutes after death.

Case No. 4.—Died October 26, 1887, 5.30 a. m. Autopsy 7 o'clock a. m., body still warm (temperature 40° C.)

From the above-described material I have had made a large number of very thin sections, which I have studied by various methods of staining and with objectives of high power—the one-eighteenth and one-twelfth inch hom. ol. im. of Zeiss. I have used especially the alkaline solution of methylene blue of Loeffler; Gram's well-known method, with methyl violet, followed by iodine solution and decolorization with alcohol; the method of Weigert, which is the same as Gram's up to the point of removing the sections from the iodine solution, when they are decolorized and dehydrated with a mixture of two parts of aniline oil to one part of xylol. I have been especially pleased with the last-mentioned method, which gives fine views of the tissue elements and any micro-organisms which may be present. I also stained numerous sections with fuchsin, in solution with carbolic acid (5 per cent.), with aniline oil (tubercle stain), and with various other aniline colors.

I think I am safe in asserting that all known pathogenic micro-organisms may be stained by one or more of the methods above referred to. Indeed, the alkaline solution of methylene blue is, so far as I know, an agent which stains all organisms of this class, although there are differences as to the rapidity with which they stain and the tenacity with which they retain the color imparted to them.

The result of this research has again been negative so far as the *general* presence of any particular micro-organism in the material examined is concerned. But in one case (No. IV) I found in the kidney a minute bacillus, which apparently invaded by preference the glomeruli. It was not found in the capillaries generally, but a certain number of foci were found, some small, as shown in Fig. 2, and involving only a portion of a glomerulus, others involving a whole glomerulus and the tissues immediately surrounding it. The appearance was such as one would expect to see in a case in which solitary bacilli, carried in the first place by the blood-current, had

effected a lodgment and established a center of infection in tissues already, perhaps, necrotic, and through which the circulation had ceased. The latter supposition seems to be justified by the fact that there were comparatively few of these foci, whereas if they had been established while the circulation was still going on we would expect to find numerous secondary foci and a certain number of bacilli in the neighboring capillary vessels. Moreover, there was no evidence of inflammatory reaction as a result of this invasion of the tissues by parasitic organisms. I am, therefore, of the opinion that this is some ordinary saprophyte which had effected a lodgment in the kidney, possibly during the last hours of life when the vital resistance of the tissues was slight, or when, as a result of the blood stasis in the organ, local necrosis had already occurred at certain points before death. It is quite probable that during the last hours of life a certain number of micro-organisms from the intestine succeed in passing through the enfeebled tissues to the interior of the capillaries, and are carried away by the already slowly moving blood-stream to distant organs, where they may establish centers of growth even before death occurs, or are at least in position to take possession of the field as soon as the vital spark has been extinguished. In the case in question I believe that the true explanation of the presence of the organisms described is that suggested, for I have not found in the other cases examined any similar collections of bacilli, and can not therefore attach any impor-



FIG. 2.—Collection of Straight Bacilli in Glomerulus, yellow fever kidney. Material from Havana.

450.

tance to the observation so far as the etiology of yellow fever is concerned. In Berlin I fell upon a little group of minute, slender bacilli, in a capillary of the liver, and recently I have found a similar group in a preparation of skin from a yellow-fever patient. I have also in the course of my extended observations seen two or three groups of micrococci or of what appeared to be micrococci. But I attach no importance to such observations. Evidently any organism concerned in the etiology of an infectious disease should be found not occasionally and in certain cases only, but, if

seen at all by the staining methods adopted, it should be found distributed through the organs involved in sufficient numbers to leave no doubt as to the presence, not as an accident, but as a general and constant thing in all cases of the disease under investigation.

The bacillus above described, present in a single case, is, then, the only micro-organism found in the material obtained in Havana, so far as the liver and kidney is concerned. In my stained sections of stomach and intestine I have observed various micro-organisms, upon the surface of the mucous membrane, but extended researches have failed to show that any one of these organisms invades the living tissues of the alimentary canal.

While in Brazil my friend Dr. Goes gave me material from nine cases in which he had made the autopsies during the epidemic of 1884, and which had been in the physiological laboratory of the Museum of Natural History (Dr. Lacerda's laboratory) since the date mentioned. Since my return to Baltimore I have mounted thin sections, stained by Gram's method and Loeffler's alkaline solution of methylene blue, from each of these cases. In two I find in the capillaries of the liver and of the kidneys an organism which has been described by Babes and by Lacerda, who found it in material collected at the same time and probably from the very same cases as those in which I now find it. This micro-organism is a short bacillus, which occurs in chains, as seen in Fig. 3.



FIG. 3.—Bacillus of Babes in kidney, yellow fever. Material from Dr. Lacerda's laboratory in Rio Janeiro. $\times 450$.

In certain places, especially in the kidneys, it is found in the capillaries in great numbers massed together; in other places it is distributed more sparsely, as seen in the figure. Careful examination of specimens stained with Loeffler's solution shows that the separate elements in these little chains vary considerably as to their length and that the ends are more deeply stained than the center. This appearance was no doubt observed by Babes, who first described the organism in question, but he has interpreted it differently. He says:

"These filaments appear united and homogeneous with an amplification of 600 diameters, but with a high power (one-twelfth hom. im., or No. 12 of Verick, which corresponds with the one-eighteenth of Zeiss) one can assure himself that these filaments are composed of elliptical grains, almost cylindrical, arranged in pairs, forming little groups in which they are united by an intermediary pale substance. The filaments are thus composed of diplococci, or, if one wishes, of very short rods with terminal spores." (*Op. cit.*, p. 522.)

Dr. Lacerda has described the organism referred to as in filaments which branch dichotomously, and believes this branching to be a constant and distinctive character of the parasite which he accepts as the veritable yellow-fever microbe. He is without doubt mistaken. The apparent branching of the filaments which he has described and drawn, and which he showed me in some of his preparations at the time of my visit to Rio, is due simply to the accidental juxtaposition of the torula-like chains. He is also mistaken in supposing that this organism is only to be satisfactorily demonstrated by Gram's method of staining. My friend Dr. Goes shared this belief at the time of my visit to Rio, but I demonstrated to him the facility with which the organism may be stained with a solution of methylene blue, upon sections which he made for me from material in Dr. Lacerda's laboratory. Since my return to Baltimore I have made numerous sections from the same material (two cases out of the nine) and find no difficulty in staining the organism present in the tissues with methylene blue or with fuchsin. Dr. Goes also supposed that his failure to find this parasite in all of the tissues which he had preserved since the epidemic of 1884 was due to the fact that the tissues had been kept too long. He thought that it was most easily stained in recent tissues, and anticipated that when he had again an opportunity to make autopsies he would encounter this micro-organism in the tissues. I shall await with interest his report of his recent researches. As already stated, I have not been able to find this microbe of Babes in the tissues of six undoubted cases of yellow fever sent to me from Havana, and examined most carefully within six months of the date of the autopsies. Babes himself has renounced the idea that this micro-organism bears an etiological relation to the disease under consideration. In the second edition of "*Les Bactéries*" he says: "Since these researches we have had the opportunity to examine several series of sections from yellow fever; first, the liver and kidneys of two individuals dead from this malady, collected by Dr. Alvarez, were examined in the laboratory of pathological anatomy of the faculty of Paris without any bacteria having been found; second, material from three cases of yellow fever which Koch was kind enough to confide to one of us. In these three last cases, notwithstanding the most scrupulous research, and notwithstanding the advice of Koch, it was impossible to find the little chains in the brain, the kidneys, the liver, and the spleen. We must suppose, then, that in yellow fever, as in other infectious maladies, microbes are only found in the parenchymatous organs in certain cases and not in all. The question whether these micro-organisms really constitute the cause of the malady, or simply a complication, is consequently not resolved."

We would remark that in view of the negative results attending Babes's more recent researches, and our own extended study of the tissues from six typical cases occurring in Havana, there is no good reason for supposing that the above described micro-organism bears an etiological relation to yellow fever. On the contrary it seems probable that its presence in material from a limited number of cases occurring in Rio is either entirely accidental or is due to a secondary complication, perhaps to some form of septicæmia. Babes has recorded the following observations with reference to his examination of the intestine:

"According to the examinations made in the three last cases of yellow fever there were in the various liquids secreted, and especially in the intestine, several species of micro-organisms. Thus in two cases we found in extended portions of the mucous membrane of the small intestine in the glands and below them short bacilli, which

resemble those of typhoid fever, but in which the large spores were often terminal. They have portions of their protoplasm but slightly colored and their extremities were a little attenuated. In one of these cases the mucous membrane was very much altered in places, had lost its epithelium and was hemorrhagic. Its superficial part was necrosed and yellow as far as the level of the glandular cul-de-sac, and the structure of the tissue could no longer be distinguished. Below the glandular layer we noted an infiltration of round cells and some of the culs de-sac of the dilated tubular glands inclosed often dense masses of the bacilli above described.

"In another case there were shorter bacilli, sometimes in pairs, in small number, either upon the surface of the intestine or in the glands. In the contents of the intestine we found in two cases dense masses of large spherical microbes of about 1μ , unequal, near which there existed always brown or yellow pigment. The urine contained in one of these cases the same agglomerations of large spherical microbes without yellow pigment, and in the two other cases a quantity of pear-shaped monads, 2μ in thickness and 3 to 4μ long, possessing a slender extremity. These monads, free, isolated from each other, easy to color with the aniline colors, contained large vacuoles. Some were in process of division. The wall of the bladder was very thick and the mucous membrane had lost in places its epithelium and was infiltrated with leucocytes. The monads penetrated between the epithelial cells. Thus it is probable that the great quantity of monads observed was in relation with the inflammatory lesions of the bladder. Alvarez has shown us drawings of micro-organisms which he has observed in the urine and which represent little chains comparable to those which we saw in our first examination of the kidney.

"Our knowledge of the micro-organisms of yellow fever is reduced, as may be seen, to a very small matter; from the histological examinations which precede we can not be sure that the micro-organism observed in our first researches is that of yellow fever. It has neither been isolated nor cultivated, and the experiments which up to the present time have been made in Brazil do not merit great confidence." (*Op. cit.*, p. 530.)

Babes is no doubt right in not attaching any special importance to the presence of the micro-organisms observed by him in the intestine and in the bladder. The bacilli with a single spore, according to his account, were found in necrotic tissues, and I have failed to find the same organism in the mucous membrane of the intestine of the four cases recently examined by me. The observation with reference to monads in the bladder is interesting, but it is probable that the inflammation of this viscus was of a chronic character and antedated the attack of yellow fever. Babes says that the mucous membrane was thickened and infiltrated with leucocytes. I have carefully examined sections of stomach from six cases, and of intestine from four. In all the material was put into strong alcohol within a brief period—fifteen minutes to two and a half hours—after death. The epithelium is generally detached, as is usual in the stomach obtained from autopsies in which it is in no way involved, when an interval of some hours has elapsed after death, but in one of my cases, in which the autopsy was made within fifteen minutes after death, the cylindrical epithelium is seen in the sections beautifully preserved, and *in situ*. In case 1, from Havana (1887), I find in the mucus and desquamated epithelium attached to the surface of the mucous membrane:

(a) A large bacillus with square ends, very abundant.

(b) Agglomerations of large oval cells, solitary, in pairs, and in short chains, 4 to 6μ in diameter—a torula.

In case 2 (Havana, 1887), I find upon the surface of the mucous membrane of stomach:

(a) A few short oval bacilli in pairs or short chains, resembling in form and dimensions those of Babes.

(b) A few larger oval bacilli in pairs.

(c) A very few micrococci.

In the same case in mucus and desquamated epithelium in the *intestine* :

(a) Very numerous short oval bacilli in chains, resembling those of Babes.

(b) Numerous large bacilli with slightly rounded ends.

Case 3 (Havana, 1887.) Surface of *stomach* :

(a) Numerous small oval bacilli in pairs and chains, resembling those above described.

(b) Slender straight bacilli in pairs, not numerous.

(c) A few micrococci.

Surface of *intestine*: The same oval bacillus in chains, and large straight bacilli with square ends.

Case 4 (Havana, 1887.) Surface of *stomach* : Cylindrical epithelium *in situ*. Very few micro-organisms observed. *Intestine* : Numerous stained masses of irregular form, and differing greatly in size, 4—12 μ .

Case 5 (Havana, 1887.) Surface of *stomach* :

(a) Small oval bacilli in pairs and chains, numerous.

(b) Masses of micrococci.

(c) A few large bacilli.

Surface of *intestine* :

(a) Masses of very minute micrococci and slender bacilli.

(b) Large spherical organisms in chains.

I am unable, from the above observations, to fix upon any micro-organism as constantly present, but consider the presence of oval bacilli in chains, resembling those found by Babes in the liver and kidney of certain cases occurring in Rio de Janeiro, as worthy of note, especially as I find this organism in abundance in the stomach or intestine in three out of five cases examined. I am not, however, willing to attach undue importance to this observation, and indeed am not positive that the organism is in all cases identical. Evidently the only way to arrive at facts from which definite conclusions can be drawn will be to make an extended series of culture experiments with material from the various organs, from the stomach, and from the intestine; to isolate the various micro-organisms encountered and to test the pathogenic power of those which there is reason to think may possibly be concerned in the etiology of the disease under investigation.

EXPERIMENTS UPON ANIMALS.

The exactions of modern science require the experimental demonstration of specific pathogenic power by inoculation into a susceptible animal, before a micro-organism associated with a specific morbid process can be accepted as the essential agent in causing the disease. In the infectious diseases of the lower animals, or those which are common to man and certain of the lower animals, *e. g.*, anthrax, glanders, tuberculosis, such proof is easily obtained. But there are certain infectious diseases of the lower animals, *e. g.*, pleuro-pneumonia of cattle, to which man has no susceptibility, and on the other hand there are certain infectious diseases of man, which, so far as we know, can not be transmitted to any one of the lower animals. Evidently in an experimental research it is desirable to ascertain at the outset whether any of the lower animals are susceptible to the disease under investigation, so that, if possible, the *experimentum crucis*, by inoculation, may be made. An attempt was made by the Havana Yellow-Fever Commission (1879) to ascertain whether any of the common domestic animals, available for experimental purposes, are susceptible to yellow fever. In the preliminary report of this commission the writer has given the following account of the experiments made :

It has been commonly reported, and is asserted by several writers of acknowledged ability, that during the prevalence of yellow fever certain of the inferior animals exhibit symptoms of sickness which are attributable to the influence of the yellow-fever poison.

(*Fide* Barton, cause and prevention of yellow fever, third edition, pp. 52-55; Fe-

rand, de la fièvre jaune à la Martinique, p. 271; La Roche on yellow-fever, vol. 2, pp. 316-318; Blair, yellow-fever epidemic of British Guiana, third edition, p. 63.)

In view of these reports, the commission was instructed as follows:

"It is obvious that if it be found possible to produce some specific symptoms in some one of the lower animals by exposing such animals in localities known to be capable of producing the disease in man, and thus to establish a physiological test of the presence of the cause of the disease, we may even hope to be able to determine the nature of and the natural history of this cause, although prolonged investigation may be necessary to effect it."

The commission has endeavored to carry out the views of the National Board of Health in this direction, but in consequence of the limited time at its disposal, the want of a suitable place to keep the larger animals, and the amount of work in other directions expected from it, it has been found impossible to make an exhaustive experimental investigation. Enough has been done, however, to make it appear highly probable that the sickness and mortality reported among animals during the prevalence of yellow-fever epidemics has been improperly ascribed to the influence of the yellow-fever poison. It is well known that many of the inferior animals suffer from epidemic diseases peculiar to their several species, and this is especially the case in southern latitudes. We know of no reason why such epidemics should not occur coincidentally with yellow fever in man, and it is not surprising that many people unaccustomed to close observation should attribute the sickness in man and in the animals affected to the same cause. In advance of any experiments designed to test the truth of such a deduction, it seemed quite improbable, from the fact that the supposed effect only results exceptionally, if at all, while domestic animals are frequently exposed in large numbers, in localities visited by severe epidemics of yellow fever, without exhibiting any symptoms of sickness. This fact is vouched for by many competent observers and is verified by the personal experience of two members of this commission.

Nevertheless, in view of the reports referred to, of the great importance in the prosecution of the investigation of a test of the presence of the poison, and of the possibility that by close observation and the use of the clinical thermometer some symptoms heretofore overlooked might be discovered sufficient to serve as such a test, it was evidently imperative that experiments should be tried in this direction. Arrangements were accordingly made before leaving New York for a supply of animals as required, and on the 24th of July the following were received per steamer *Niagara*, viz: Four dogs, two cats, six rabbits, six guinea-pigs, one monkey, six chickens, twelve pigeons, and two geese. Subsequently (August 30) six more dogs were received.

All of these animals were carefully observed, and various experiments were tried for the purpose of testing their susceptibility to the influence of the yellow-fever poison. The details of these experiments are given in a special report to the National Board of Health, dated October 15. It is not deemed necessary to give these details in the present report, but the general statement may be made that the results were negative. No symptoms were produced in any of the animals experimented upon which can fairly be attributed to the influence of the yellow-fever poison.

The clinical thermometer was constantly used for the purpose of recognizing any slight febrile movement which might possibly occur, and the blood was examined microscopically from time to time. As the experiments made gave no promise of positive results, the commission did not feel justified in giving more time to this portion of the investigation. It is, however, of the opinion that the reports heretofore referred to and the importance of a physiological test of the presence of the poison would justify the National Board of Health in pursuing this inquiry in future, especially with such animals as this commission has not experimented upon. A few experiments are here given as examples of those made:

"*Experiment No. 1.*—On the morning of July 28, four days after arrival in Havana, the following animals were exposed on board the infected brig, *John Welch, jr.*, viz: two dogs, two cats, one monkey, two rabbits, three Guinea pigs, two geese, three chickens. The time of exposure was forty-eight hours, at the expiration of which time the animals (in cages) were brought back to the laboratory. The *Welch* was a very foul ship, and was loaded with molasses. During the time the animals remained on board six of her crew (all) were down with yellow fever. After bringing the animals back to the laboratory the temperature of each was carefully taken, and daily observations were continued for some time after. No symptoms of sickness presented themselves except in the case of one dog. This animal suffered a sharp attack of fever, but it is believed that the case was one of a disease common to imported dogs in Cuba known as *romadizo*, a disease the clinical history of which is very different from that of yellow fever. (See special report to National Board of Health, dated October 15, for full history of this case.)

"*Experiment No. 4.*—Injected yellow-fever blood, $1\frac{1}{2}$ drams, of first day into femoral vein of dog No. 3. Blood obtained by cupping from patient in civil hospital

and mixed with a small quantity of soda bicarb., to prevent coagulation; *result* entirely negative.

"*Experiment No. 10.*—One-half of a blanket from a yellow-fever patient's bed was placed in the cage with dog No. 4 and left there for several days. *No result.*"

"*Experiment No. 11.*—Dog No. 5 was allowed no water for two days, except a supply in which the other half of this blanket (*Experiment No. 10*) had been washed. *No result.*"

More inoculation experiments would have been made in Havana, if any micro-organism had been found in the blood, but in the absence of any evidence that the animals brought from New York were susceptible to the yellow-fever poison when exposed to the conditions under which man contracts the disease (*Experiment No. 1*), and on account of the limited time at my disposal, I did not follow up this line of investigation.

EXPERIMENTS OF DR. FREIRE.

We quote as follows from Dr. Freire's principal work ("*Doctrine Microbienne de la Fièvre, Janne, 1885*"):

"My first experiments made upon the monkey and the dog gave a negative result" (p. 35).

"I have also inoculated black vomit into a dog, repeating the injection twice, at intervals of some days. * * * No phenomenon indicative of yellow fever manifested itself" (p. 36).

"Fowls and pigeons also enjoy a complete immunity, as we shall see further on. After having inoculated these animals with blood drawn directly from the corpses of yellow-fever patients, and also with cultures of different degrees of transplantation, without having succeeded in any case in transmitting to them the malady, I turned my attention to other animals, to rabbits and to guinea-pigs."

"My attention was especially called to guinea-pigs because a merchant of the place said to me that just when the epidemic had attained its maximum of intensity he supported an enormous loss on account of the *peste*, which killed each day a great number of his guinea-pigs" (p. 36).

We remark that the guinea-pig is very subject to various forms of septicæmia, and that those who have endeavored to raise them in latitudes where yellow fever does not prevail have often experienced heavy losses, especially during hot weather and when their cages are not carefully cleaned. My guinea-pigs in Havana did not contract yellow fever, although they were exposed on an infected ship during the hottest part of the year for a period of forty-eight hours. Moreover, Dr. Freire himself gives evidence that during the winter months he inoculated these little animals with blood from yellow-fever patients without result. He says:

"The influence of season upon the evolution of the microbe of yellow fever is very powerful. For the purpose of determining the nature of this influence we have proceeded to various experimental researches. We have inoculated a large number of guinea-pigs, not only by the method of vaccination but also by sub-cutaneous injection of cultures of the microbe in gelatine. These cultures showed themselves fertile in characteristic organisms, and their energy had already been proved, since their inoculation had caused the death of several animals. Very well, these inoculations made in July and August have given only negative results. The animals presented a slight elevation of temperature, but survived the consequences of the inoculation. Even the blood of patients sick with yellow fever transported [inoculated] into animals in the months of July and August could not cause their death. Indeed, on the 15th of August we have injected with the blood of a patient attacked with yellow fever nine guinea-pigs. The following is the course of the temperature as observed:

No.	Before the experiment.	After injection.			
		July 16.	July 17.	July 18.	July 19.
	°	°	°	°	°
1.....	38.9	39.0	37.8	38.2	39.0
2.....	38.8	38.7	39.0	39.0	39.6
3.....	39.0	39.0	38.0	38.4	38.8
4.....	38.6	39.9	38.9	38.8	38.6
5.....	39.0	39.2	38.0	39.0	39.0
6.....	38.8	39.0	38.8	39.8	40.0
7.....	39.1	39.0	38.5	38.9	39.4
8.....	39.2	39.2	37.4	39.0	38.5
9.....	38.8	38.2	39.6	39.2	38.5

"The following days the temperatures of nearly all of these animals became normal. None of them died. This fact shows the innocuity, due to a change of season, of the inoculations which a month previously showed themselves virulent and so toxic that they infalibly caused the death of all the animals" (p. 235).*

Dr. Freire has referred to the experiments of Dr. Rangé, "Médecin de première classe," of the French navy, as confirming his own. These experiments were made during an epidemic which occurred in 1885, upon the *Iles du Salut* (Guyane).

The inoculation experiments of Dr. Rangé were made *during the height of the epidemic*, in the month of April. He says:

"In guinea-pigs inoculation of blood taken directly from the patient was not followed by any result. Inoculations with *black vomit*, *cultures from blood*, or *cultures from black vomit* gave always a positive result—that is to say, they were followed by reactional phenomena; four times they determined death."

These cultures, like those of Dr. Freire and others obtained from the same source, no doubt contained various organisms, and among them one or more may have been pathogenic for the guinea-pig, but the experiments made show most definitely that blood drawn directly from the patient *during the epidemic season* does not kill guinea-pigs. We must therefore conclude that the death of guinea-pigs inoculated by Dr. Freire during the epidemic season resulted not from yellow fever, but from inoculation with some pathogenic organism, which was abundant during the summer months, and consequently was present in his cultures, or from accidental inoculation through the wound made by him in his experiments. The guinea-pig is very subject to the last-mentioned accident, especially when kept in foul cages. Its own discharges, and the remnants of food in its cage furnish a patulum in which a multitude of micro-organisms are to be found. Owing to the shortness of its legs its abdomen is constantly soiled with this material, and if any pathogenic organism is present, an inoculation wound made for experimental purposes can scarcely fail to be infected with it.

It is scarcely worth while to give in detail the experiments upon guinea-pigs made by Freire, in which death followed the inoculation, and in every one of which the assumption is made that the animals succumbed to yellow fever. But his summary statement of these experiments presents some points of interest. Thus we find that one animal died at the end of a few hours, while one lived for thirty days. Yet death in both of these extreme cases is ascribed to yellow fever, resulting from the inoculation practiced.

* In Havana, during the past summer, I have inoculated a number of guinea-pigs with blood from the heart and with material—blood and crushed tissue elements—from the liver of yellow-fever cadavers, and have always had a negative result when the autopsy has been made very soon after death. On the other hand, I have found that material from the liver which had been kept in the laboratory for some time is very virulent. A full account of these experiments will be given in my final report.

The following résumé is given:

	Animals.
Duration one to three days.....	9
Duration four to eight days.....	8
Duration nine to fifteen days.....	5
Duration more than fifteen days.....	1

Dr. Freire remarks that in the case of four animals the duration of the malady can not be precisely determined, inasmuch as they died spontaneously, *i. e.*, without having received an inoculation. In these cases also Dr. Freire infers that the cause of death was yellow fever, and in all of the autopsies he finds evidence satisfactory to himself that such was the fact. I shall not attempt to analyze this evidence in detail, but quote that relating to the color of the liver alone. Pathologists are generally agreed in considering the color of the liver in yellow fever, due to fatty degeneration of the organ, as the most characteristic pathological appearance. In man the liver has a color which has very aptly been compared to that of new leather. Now, in Freire's summary statement of the color of this organ in his inoculated guinea-pigs we find (p. 178) that it was blackish (*noirâtre*) seventeen times; bronze color in one case; punctate with yellowish white, once; straw color, once; with pink spots, once; color not mentioned, six times.

I shall quote here a single experiment in which a fatal result occurred, and in which, as usual, Dr. Freire ascribes death to yellow fever resulting from the injection, notwithstanding the fact that the material injected (blood) had been subjected to a boiling temperature for some minutes. My own numerous experiments show that all known micrococci are quickly destroyed by a temperature much below the boiling point of water.*

Dr. Freire's account of this remarkable experiment is as follows:

"We must note that the microbe of yellow fever offers a remarkable resistance to heat. The following experiment furnishes a demonstration of this:

"On the 17th of April, 1883, we subjected to ebullition for several minutes a gram of blood containing the microbes. We injected it afterwards into a guinea-pig, which had a temperature before the experiment of 38.5° in the axillary region. The temperature followed this mark the following days: April 18 and 19, 39°; 20, 39.1°; 21, 39°; 22, 38.7°; 23, 37.4°. The animal died during the night of the 23d. Its autopsy showed the characteristic lesions.

"It is necessary to push the temperature beyond 200° in order to destroy the toxic energy of the microbe, as we have seen its virulence resist simple ebullition. The microscope has shown that notwithstanding the boiling the micro-organisms retained their ordinary form *and continued to execute all of their movements*, a proof of their complete vitality" (*op. cit.* p. 217).

I may remark here that the micrococcus presented to me by Dr. Freire as his yellow-fever germ is killed by exposure for ten minutes to a temperature of 60° C. (140° Fahr.), and that it has no proper movements. Upon his return from Paris, Dr. Freire attempted to demonstrate to me the specific character of the micrococcus which he had presented to me, as his microbe of yellow fever, by a series of experiments upon guinea-pigs. He first proposed to "regenerate the virulence" of his cultures by passing the microbe through the body of a pigeon.

On the 7th July a bouillon culture was injected (1 gram) into the subcutaneous connective tissue beneath the wing of a pigeon. At the end of four hours the bird was killed, and 1 gram of blood from its heart was injected into the peritoneal cavity of a guinea-pig. The virulence of the microbe was supposed to be regenerated by its presence for the time mentioned in the blood of the pigeon. The question at once arose whether the micrococcus injected beneath the wing of the pigeon was really present in the circulation at the time the bird was killed. To test this, I mounted

* The thermal death-point of pathogenic micro-organisms. *Am. J. of Med. Sci.*, July, 1887, pp. 146-160.

some blood from the heart for microscopical examination and made inoculations into three tubes of agar-agar. The result of the direct examination of specimens of blood stained with fuchsin was entirely negative, as was also that of the culture experiment. No development occurred in any of the agar tubes. On the 29th of July, twenty-two days after the experiment, the guinea-pig inoculated with blood from the heart of this pigeon still remained in good health. On the 9th of July, Dr. Freire inoculated two small birds, native of Brazil, with blood collected from the heart of the above-mentioned pigeon. I could not discover any micro-organisms in a stained (fuchsin) preparation of this blood.

July 13.—One of these little birds was found dead. Tubes of bouillon and of gelatine were inoculated with blood from its heart. In these I found, on the 19th, an abundant development of a minute bacillus resembling the bacillus of rabbit septicæmia. Dr. Freire insisted at first that the organism found in these cultures was identical with that—the micrococcus—which we had injected into the pigeon on the 7th of July. I pointed out to him the oval form, the end staining and the smaller dimensions, but was not able to convince him that the organism was not the same until I had made cultures in Esmarch tubes and demonstrated a difference in the appearance of the colonies and the fact that one organism—the micrococcus—liquefies gelatine and the other does not. The companion of the little bird which died in the above-mentioned experiment escaped from its cage on the 14th of July and flew away.

July 20.—Two guinea-pigs were inoculated with above-mentioned culture (from heart of small bird), one in cavity of abdomen, one in subcutaneous connective tissue. One of these guinea-pigs was found dead and one dying on the 30th of July. The one still living was killed, and two cultures were made with blood from its heart and liver in tubes of agar-agar. On the 1st August these cultures remained sterile; on the 4th August one of the tubes from the liver contained a bacillus with a single end spore, and one from the blood of heart a large coccus in tetrads. The other tubes remained sterile.

July 11.—Two guinea-pigs were inoculated in the cavity of the abdomen with about one gram each of a pure gelatine culture of Freire's micrococcus. One of these guinea-pigs was found dead on the morning of the 19th; the other died July 23.

Autopsy of No. 1.—Liver dark-colored and quite soft; spleen normal; no micro-organisms found in blood of heart on direct examination of specimens stained with fuchsin. Two agar-agar tubes inoculated with blood from heart. These remained sterile.

Autopsy No. 2.—Liver soft and dark-colored; spleen normal; bladder full of urine, non-albuminous; stomach empty; animal much emaciated; blood from heart used to inoculate one Esmarch tube and two agar tubes; no development in any of these tubes when examined at the end of five days.

Remarks.—Both of these guinea-pigs were supposed by Freire to have died of yellow fever, although they had been inoculated with a culture not "regenerated" by passing it through the blood of a pigeon, and one which he had taken with him to Paris and back. Yet he repeatedly asserts in his published works that the virulence of his microbe becomes quickly attenuated in cultures preserved for a short time. Thus he says in his address before the Dosimétrique Society of Paris, in 1887:

"Besides, the cultures become attenuated when left alone after a time by the influence of the air to such a degree that a liquid primitively virulent may be inoculated without danger seven to ten days after."

Notwithstanding the above very positive statement Dr. Freire was unwilling to show me his method of inoculating man by using some of this culture brought from Paris, and stated that the fact that these guinea-pigs had died was evidence that this culture—which had crossed the ocean and back—was too virulent to be used as a vaccine. Yet his experiments had been inaugurated with a view to regenerating the virulence of this same culture, upon the assumption that it was too attenuated to kill guinea-pigs.

On the 12th of July a second pigeon was inoculated with two grams of a gelatine culture of Freire's micrococci; this was killed, as in the previous experiment, at the end of four hours and blood from its heart was injected into the peritoneal cavity of two guinea-pigs—one-half gram in each.

Two small birds, native to Brazil, and said by Freire to be very susceptible to yellow fever, were inoculated at the same time, by injecting a little blood into the muscles under the wing of each. These birds remained in good health so long as I had them under observation. On the 16th of July, four days after the inoculation, at the suggestion of Dr. Freire, one of the guinea-pigs, which remained in apparent good health, was killed by introducing a pointed instrument into the medulla. I examined a stained preparation of blood from the heart, but was not able to discover any micro-organisms in it. Two agar-agar tubes were inoculated with blood from the heart—they remained sterile.

The second of the above guinea-pigs died at the end of ten days, July 22. It was found dead in its cage at our morning visit on the date mentioned. Liver, dark-colored and soft; spleen, normal; bladder full of urine which is not albuminous. No micro-organisms found by me in stained preparations of blood from heart. Freire finds his cocci in these preparations. Two agar tubes inoculated with blood from heart remained sterile. One agar tube inoculated with pulp from interior of liver. This tube examined on Monday morning, July 25, was found to contain an abundant development of micrococci, which seemed to be identical with those in Freire's original culture. The tube, which I had sealed hermetically at the time of making the inoculation, had been opened by Dr. Freire for the purpose, as he said, of examining the culture. This culture was subsequently used for the following experiment.

Our guinea-pigs up to the present time had been kept in the animal room attached to Dr. Freire's laboratory, which had served for his former experiments, and contained a considerable number of wooden cages, some old and some new, which were arranged in rows, one above the other. I had originally purchased in the market twelve guinea-pigs, which were placed in these cages. As will be seen from the above account of our experiments, a number of these had died after various inoculations which we had practiced. But in the mean time I had several guinea-pigs in the same cages which, not having been inoculated, served as control animals—*témoins*. On the 14th of July, seven days after the guinea-pigs had been placed in these cages, the janitor of the laboratory reported that three of those not inoculated had already died. Dr. Freire suggested that they had probably died from yellow fever contracted in the laboratory, and stated that this had frequently occurred in his experience. Yet we were now in mid-winter, and no yellow-fever cases were to be found in the city. I naturally suspected that the cages in the animal room were infected with some micro-organism pathogenic for guinea-pigs, although none was found in my cultures. I therefore proposed that the next experiment should be made upon animals which had not been in the animal room, and which should be kept in a new cage in a room which had never been used for similar experiments. Accordingly the following experiment was made under these conditions:

July 25.—Inoculated two guinea-pigs in cavity of abdomen, with culture from liver of guinea-pig which died July 22. The guinea-pigs were placed in a clean cage in a closet attached to Dr. Freire's laboratory. At the date of my departure from Brazil, August 8, these guinea-pigs remained in good health. The fact that these animals did not die was accepted by Dr. Freire as evidence that the culture with which they were inoculated was sufficiently "attenuated," and he consented to make some inoculations in man in my presence.

DR. FREIRE'S METHOD OF MAKING PROTECTIVE INOCULATIONS.

In his address before the Dosimetrique Society of Paris, from which I quote as being one of his most recent statements, Dr. Freire says:

"The vaccinal liquid is prepared as follows: I inject the blood of a patient, dead,

or on the point of dying from yellow-fever, into the veins of a guinea-pig or rabbit; then the blood of this first animal is inoculated into the blood of a second of the same species, and thus in succession up to the sixth or seventh animal. With the blood of the last cultures are made, which are transplanted at least four times; it is then that I commence to inoculate man, not without having tested in advance upon animals if these inoculations were not capable of producing accidents of a certain gravity."

I would remark that all of the evidence heretofore presented goes to show that the micro-organisms present in Dr. Freire's cultures did not come from the blood of the yellow-fever patients from whom blood was taken, but from the surface of their bodies, or from accidental contamination with organisms floating in the air, etc.

He has simply shown by his experiments that such cultures during the summer months are pathogenic for guinea-pigs, but the inference that these guinea-pigs die of yellow fever has no scientific foundation. It is quite possible that in a locality where yellow fever is endemic, his cultures have at times contained the veritable yellow-fever germ, but if so we must regard its presence as accidental and unrecognized. With reference to the method of inoculation practiced, I quote from Dr. Freire's "Report upon preventive inoculations for yellow fever during the epidemic which prevailed in 1883 and 1884 in Rio de Janeiro."

"II.—*Method of preparing the cultures.*

"I have never inoculated in man blood or any other liquid taken directly from the cadaver or from one sick with yellow fever, as some persons have insidiously reported. I proceed in the following manner:

"I pass the blood of yellow-fever patients through an extended series of animals, into which I inoculate it successively, and it is the blood of these animals that I subject afterward to cultivation. After having transplanted the cultures more than four times I commence to inoculate them in man, after having previously verified upon animals if they are capable of producing accidents of a certain gravity.

"I make this observation in order that it may be seen that I have never proceeded lightly. It is evident that being thus prepared the cultures of the microbe which were inoculated in man represented a generation far removed from the primitive microbe, a tenth or twelfth generation which preserved its primitive characters of configuration and of development proper to the species, and which was characterized only by a notable diminution of the microbial energy.

"The attenuation is explained by the new *milieu*, in which I have placed the micro-organisms, in causing them to pass through the organisms of inferior animals and in cultivating them afterward in sterilized flasks containing beef bouillon, gelatine, or milk.

"It is proper to remark that in the epidemic intervals the cultures become attenuated, and the microbe feels the influence of the air in such a manner that if, in a sporadic case, we withdraw the blood of a patient and inoculate it some hours after into an animal, it happens very often that it is not attacked with the malady.

"It is for this reason that the sporadic cases are in general less grave than the epidemic cases; the sporadic microbe is already more or less attenuated by natural influences.

"I am happy to declare to your excellency that my method of attenuating cultures by transplantation from one species of animal to another species has been applied with success by M. Pasteur to modify the virus of hydrophobia by transporting it from the dog to the guinea-pig, the monkey, etc.

III.—*Method of vaccinating.*

"As was natural the timidity of my first efforts did not permit me to introduce into the human organism a large dose of the microbial culture. For this reason I have

employed in almost all the vaccinations the endemic method, and have only recently injected the same cultures into about twenty persons hypodermatically.*

"The cultures were withdrawn from Pasteur flasks with all the care necessary to avoid the entrance of foreign germs, and preserved in little flasks holding 4 to 8 grams, previously sterilized by heat and having ground glass stoppers. The liquid was poured into a clean watch glass and some drops taken upon the point of a vaccinating lancet and introduced under the skin by means of five or six punctures, leaving the point of the instrument inserted as long a time as possible, in order to assure absorption. The point chosen for practicing the inoculation was the deltoid region.

"When the hypodermatic method was employed about a gram of the liquor was drawn into a Pravaz syringe, and this was injected in the usual way.

"In future I shall give preference to the last-mentioned method as being more sure, since we have the certainty that all of the liquid employed goes to exercise its preservative influence."

Dr. Freire's vaccinations have been for the most part made by two apothecaries in Rio, who have acted under his instructions. The method in which the experiment was made as well as the theory upon which it was founded and the experiments which furnished the basis of this theory have all received severe criticism at the hands of some of the most prominent of Dr. Freire's confrères in Rio. As these criticisms have been published in the city of Rio, and are made by members of the Imperial Academy of Medicine, who enjoy the confidence of the Government and are now occupying important official positions, I think it proper to introduce them here. The following is a translation of a letter by the Baron de Ibituruna, president of the central board of public hygiene, which was published in one of the daily newspapers of Rio:

YELLOW FEVER VACCINATION.

I am obliged to correct the statements made by Dr. Domingos José Freire in his article of the 7th instant, and in so doing I shall simply narrate facts, as I consider it unnecessary to enter into a formal discussion of the question.

On November 9, 1883, the department of the Empire gave the following instructions to Dr. Freire, then president of the board of health:

"As the board of health, at its meeting on the 16th ultimo, authorized inoculation with the liquid obtained from the culture of the microbe, for the purpose of testing its efficacy as a preservative from yellow fever, as you informed me in your communication of the 29th ultimo, you may insert advertisements in the *Diário Oficial* and in some other widely circulated journal, inviting, as you suggest, newly arrived persons or any others who desire to be inoculated to call at the Vaccine Institute on Wednesdays and Saturdays between 10 and 12 o'clock a. m. The cost of publishing the advertisements will be defrayed by this department.

"God guard you.

"FRANCISCO ANTUNES MAIREL.

"To the President of the Central Board of Public Health:"

When the sanitary service was reorganized, in virtue of the new regulations, I wrote to Dr. Freire inviting him to call at the board of health office on the days and at the hours mentioned in the above-quoted instructions for the purpose of continuing to perform inoculations with the microbial liquid, and in doing this I executed the orders of the minister of the Empire.

Dr. Freire, calling at the board of health office, informed me that he was ready to continue the yellow-fever vaccinations, but intimated that, as few persons went to the Vaccine Institute for the purpose of making use of his preservative, he desired permission to perform vaccinations in private houses when requested to do so.

* "After being vaccinated nearly all the persons presented the following symptoms: Supra or infra-orbital cephalalgia; contusive pains along the vertebral column or in the limbs; elevation of temperature (from some tenths of a degree to a degree); general feeling of feebleness; sometimes the tongue was coated; nausea and rarely vomiting; in some cases I have noted injection of the conjunctivæ. These phenomena have never compelled the person to keep his bed."

Exceeding my instructions, I gave him the authorization solicited and communicated the fact to the minister of the Empire, who approved of my action.

Some days afterwards I received information from health officers that some of Dr. Freire's vaccinators, calling themselves members of the board of health, and claiming to act under the authority of the police, were invading tenement houses and vaccinating by force every one they met without regard to race, color, nationality, time of residence in the country, or other circumstances which should be taken into consideration in the study of a scientific question of this importance.

I copy the communications received from the delegates of this board, so that M. Pasteur and other European *savants* may take note of our *savants* in this country who profess to keep pace with scientific progress and by certain newspapers are proclaimed compeers and rivals of the most brilliant ornaments of the scientific world.

"To His Excellency BARON DE IBITURUNA,

"Inspector-General of Public Health :

"I deem it my duty to inform your excellency of a serious abuse which should be promptly checked. Yesterday, when making a sanitary visit to Rua Conde d' Eu I was informed by a boy living in a tenement house on that street that the board had been there last week vaccinating the yellow fever. On my asking him who was the "board," he answered, Apothecary Telles.* He added that this vaccinator compelled the tenants to submit to the operation, threatening those who refused.

"Surprised at this statement, and indeed scarcely able to credit it, I asked the boy to show me some of the persons vaccinated by Mr. Telles, whereupon he conducted me to the tenement house No. 132 B and showed me several rooms whose tenants had been vaccinated.

"I was there informed by some poor ignorant Portuguese and negro women that Mr. Telles, accompanied by one of his clerks and another young man, had been there and commanded them all to be vaccinated with the microbe, such being, he said, the order of the Government.

"Some of them, intimidated, reluctantly submitted; others, more courageous, declared that they would not be vaccinated, no matter what might be the consequences. He ordered these to present themselves at the police office for having disobeyed the commands of the higher authorities.

"Growing angry and noisy, he commanded those who would not then be vaccinated to appear before the board as soon as possible, threatening the refractory with the police. One poor woman had to struggle to keep him from vaccinating her little child who was ill with fever and taking medicine.

"A negro woman showed me on her arm a hard knot, which she said was very painful, caused, as she declared, by the instrument which Mr. Telles used in vaccinating her.

"In the neighboring tenement house at No. 130 Mr. Telles also endeavored to vaccinate the tenants. He was resisted, however, by two Portuguese women, who declared that they would not submit to the operation, and that moreover they would not go before the police authorities, as they had not committed any crime.

"I deem it unnecessary to add to this statement anything to justify the indignation I felt when these facts were narrated to me or to prove that this abuse should be corrected. Mr. Telles is not even a pharmacist, and, even if he were a physician, he would not be allowed to inoculate with the yellow-fever microbe. Should he receive permission to do so, he assuredly would not be allowed to employ force, threats, and violence.

"I have deemed it my duty to communicate these facts to your excellency, who, I hope, will approve of my action in advising the tenants of these and other tenement houses not to allow Mr. Telles or any one else to vaccinate them except of their own free will.

"Dr. DERMEVAL DA FONCECA.

"RIO, March 4, 1886."

"To His Excellency BARON DE IBITURUNA,

"Inspector-General of Public Health :

"In addition to what I yesterday made known to your excellency, I must inform you that I subsequently returned to the tenement houses on Rua do Conde d' Eu, having requested Dr. Aranjó Góes, member of the board of health, to be present for

* Apothecary Telles is a mulatto, who has a small drug store in a neighborhood surrounded by tenement courts (*corticos*). Four individuals were inoculated by him in my presence to demonstrate the method. One of these was a negro and another a Portuguese who had resided in Rio for many years. Telles informed me that he had inoculated more than two thousand individuals and that not only had the inoculation protected them from yellow fever but also from small-pox, which was prevailing as an epidemic at the time of my visit to Brazil.—G. M. S.

the purpose of taking the depositions of the tenants of those houses in regard to the abuses committed by the pharmacist, J. Telles Sampaio.

"The following persons declared that Mr. Telles, by means of threats, succeeded in vaccinating them with the yellow-fever microbe:

"Porphyria, a negro woman residing in the tenement house at No. 130 B, Rua do Conde d'Eu.

"Amelia, a negro woman, twenty-three years old, living in the same house. She declares that in another room some of her children were also vaccinated by force.

"João Soares Guimarães, a Portuguese. He declares that his wife was ordered by Mr. Telles to appear at the police office for having refused to be inoculated with the microbe.

"Maria Luiza da Silva, residing in the same house. She declares that Mr. Telles endeavored to vaccinate by force her little daughter, two years old, who was ill with fever. She stoutly opposed this, though threatened with the police.

"Emilia Augusta and Maria José, two Portuguese women, residing at No. 130 B, Rua do Conde d'Eu. They were ordered by Telles himself to appear at the police station for having refused to be vaccinated.

"Bernardino José Brito, a Portuguese, residing at No. 130 Rua do Conde d'Eu, and owner of a drinking saloon at No. 120 D of the same street. He declares that Mr. Telles, by force and fraud, vaccinated his six-year-old daughter against the wish of her relatives. The deponent was absent from home at the time, and, when on his return the fact was related to him, he was very indignant and wrote an article, which was published in the *Gazeta de Noticias* of January 23, complaining of the board of health, to which he attributed what had occurred, as Mr. Telles claimed to be a member of the board.

"The persons vaccinated say that Mr. Telles, when he went to the tenement-houses, carried with him the microbe in a cup, from which he took it with a large lancet. With this instrument he vaccinated on the arm the imprudent persons who had not the courage to resist his orders and threats.

"Communicating this to your excellency, I deem it my duty to add that many persons, supposing us to be emissaries of Telles, were afraid to give evidence or to show us any one who was willing to do so.

"Dr. DERMEVAL DA FONSECA.

"RIO DE JANEIRO, March 5, 1886.

"A true copy.

"Dr. PEDRO AFFONSO DE CARVALHO, *Secretary*.

"BOARD OF HEALTH, March 9, 1886.

"BOARD OF HEALTH, LAGÔA DISTRICT,

"Rio de Janeiro, March 20, 1886.

"To-day there appeared before us Mrs. Eliza de Jesus Alves, wife of Manuel Alves da Costa, jr., residing at No. 2 Rua de Sorocaba. She carried in her arms her little boy, some four or five years of age, whose body, head, and face were covered with a generalized ecthymic eruption. She declared that this eruption, which had appeared not only on the child she had brought with her, but also on four others, and on herself as well, had been caused by vaccinations (subcutaneous injections) performed, almost by force, on their arms by a man said to be an apothecary of the Rua do Conde, who said that it was to keep them from having yellow fever, and that for the poor this vaccination is obligatory. The operation was performed with incredible rapidity, almost without their consent, or that of other persons who were vaccinated at the same time, and even through shirt and coat sleeves. In view of such brutal conduct, we call the attention of the honorable board to these outrages, which are by no means the first cases of this kind, for complaints have been made by victims in other parishes. The poor child and his little brothers are in a really pitiable condition.

"Dr. JULIS BRANCTAO,

"Dr. CARNEIRO,

"Delegates."

"To His Excellency BARON DE IBITURUNA:

"I wish to inform your excellency that I have caused to be disinfected the rooms in the tenement-house at Rua do Marquez de Abrantes No. 16, in which had died, of yellow fever, a boy named Carlos, three years of age, and son of Joaquim Pereira Tenas. This boy had been vaccinated with the culture of the yellow fever microbe by two persons who compelled him to submit to this operation.

"The obituary certificate was signed by Dr. Marinho de Azevedo.

"Dr. AZEVEDO,

"Delegate for the Parish of Gloria.

Rio, April 10, 1886."

In my interview with Dr. Freire, at the board of health office, I requested him not to continue to have vaccinations performed at the drug stores on Rua Primeiro de Marco and Rua de Conde d'Eu, refraining through delicacy and respect for his feelings from mentioning what I knew about the latter drug store, which is illegally under the direction of the practical druggist, Telles de Sampaiz, in virtue of verbal permission given by Dr. Freire, as president of the old board of health.

* * * * *

It is my sincere desire that Dr. Freire may continue to study the preservative action of his microbial cultures in relation to the yellow fever, but that he may do so calmly and without bias, like a scientific man, as did Edward Jenner in regard to vaccine matter as a preservative from small-pox.

Let him avail himself of the labors of his professional brethren, and let him select assistants qualified to elevate his theories in the opinion of the public and the profession instead of recruiting them among speculators and frequenters of tenement houses, who obtain greater numerical results by making victims and not disciples.

Let him again attend the meetings of the Academy of Medicine, where he has always been listened to with interest, and let him there recount his triumphs without showing offense if some colleague happens to differ from him. He should remember that science has always had its martyrs, but that these in compensation have been glorified by history.

Let him not be deceived by the praise bestowed on him in the press by persons who for purposes of their own make use of his name.

There have already been recorded many cases of deaths among persons inoculated with the microbial liquid, including the members of a respectable family vaccinated a year ago in Catumby. One member of this family died of a pernicious lymphatitis a few days after vaccination, and another of yellow fever a little over two months ago. Every one else in the house had the yellow fever, although vaccinated. The person who fared best, having only a mild attack, was one who was absent when Dr. Freire invaded the house and performed the vaccinations without the previous consent of the head of the family.

I am inclined to believe that Dr. Freire's failures would be fewer if the vaccinations had all been performed by himself; from those performed by force with the liquid carried about in a cup and with improper instruments by his assistants, who invade tenement-houses, science can expect little benefit and humanity still less. If Dr. Freire wishes, I will assist him in his meritorious labors. I will request the minister of the Empire to modify the instructions of November 9, 1883, so that Dr. Freire may be allowed to vaccinate in all the city and suburban parishes of Rio de Janeiro, and I will appoint a delegate of this board to assist him and record his observations.

At the board of health office I myself will be his assistant.

I am sure that the minister of the Empire will not refuse to authorize me to have this done, for I have innumerable proofs of his sincere interest in everything relating to the improvement of the sanitary condition of the country.

Let Dr. Freire abandon his unfounded belief that everybody is opposed to him; let him fraternize with his professional brethren, whose praiseworthy scientific labors may be useful to him; let him close his ears to the flattery which fascinates him and causes him to deviate from the path he should follow, and his country and humanity will gratefully bless his name, if his efforts are crowned with the success we all so earnestly wish him.

BARON DE IBITURUNA.

RIO DE JANEIRO, April 11, 1886.

The following is from an address made by Dr. Nuno de Andrade, inspector-general of ports, at a meeting of the Imperial Academy of Medicine on the 14th of July, 1885. It is translated from the Bulletin of the Academy:

Dr. Freire says that the approach of the cool season is sufficient to neutralize the virulent force of the microbe and render it harmless, so that cultures which had previously been fatal to the animals inoculated were in cool weather entirely innocuous.

Dr. Freire still further remarks that not only the cultures but also the *very blood* taken from the corpses of persons who have died of yellow fever loses its virulence in cool weather, which he attributes to the microbes being dormant. All this is supremely obscure. It is not easy to understand how a microbe that has just killed a man can be considered dormant and unable to transmit the disease to a rabbit.

Besides, Dr. Freire, desirous of corroborating his assertion that the virus is spontaneously attenuated under the natural influence of the cool season, proceeded to make a number of experiments for the purpose of learning whether heat has the property of restoring to the microbe its virulence. These experiments are so con-

fused and unedifying that Dr. Freire, on page 242 of his new book, declares that "heat alone is not sufficient to restore to the microbe its venomous and deadly force."

Dr. Freire's doctrine in regard to the attenuating effects of the cool season seems, therefore, inexplicable. This, however, does not hinder him from saying on page 367: "After having proved by experiment that heat stimulates the virulent force of microbes * * * so that they produce venomous principles which occasion serious disorders and even death."

Dr. Freire's experiments proved no such thing, as he himself confesses on page 242, and, as he manifestly contradicts himself, there is no impropriety in asking which of the two opinions he definitely decides to adopt—that of page 242 or that of page 367?

If he adopts the former, he repudiates his attenuation theory; if he adopts the latter, the matter becomes more serious, and should attract the attention of the sanitary police.

In fact, Dr. Freire asserts that, owing to the recovery of their poisonous faculty by the cultures in summer, preventive inoculations should only be performed in the period from July to December (page 367). The speaker, therefore, invoked the just indignation of the president of the board of health upon the conduct of Dr. Freire, who, knowing that the cultures are noxious and even fatal in summer, is now inoculating with them in the tenement-houses of the city. Either the cultures have recovered their virulence, and in this case these inoculations are a calamity, or they are harmless, and in this case the doctrine of page 367 is false.

Dr. Freire's obscurities are so much the more to be regretted since that experimenter, shielding himself with the authority of the Imperial Government and the board of health, is inviting the public to be vaccinated, thus jeopardizing in an experiment of doubtful issue the dignity of the Government and the scientific circum-spection of the board.

My instructions required me to investigate: "Second. The method of inoculation, which you will see verified if practicable on actual cases."

I showed my instructions to Dr. Freire, and mentioned my desire to see some inoculations made a day or two after first meeting him, but on the 23d of July, when I again urged this matter upon his attention, he stated that the culture brought from Paris was too virulent for such inoculations, as one of the guinea pigs inoculated with it had died. Yet, at the outset of our experiments, he had stated that it was necessary to regenerate the virulence of this same culture, which was from stock which he had taken to Paris with him, and must consequently have been obtained many months previously. Moreover we were now in the midst of the cold season in Rio, when, according to Dr. Freire's repeated assertions, neither blood nor cultures from it have any considerable virulence. He stated at this interview that it would be necessary to again attenuate the culture by injecting a quantity of blood from the heart of a guinea pig, just dead, into a pigeon, and from the pigeon into another guinea pig, and so on until one failed to die; the blood of the last could then be used to start fresh cultures, which would be suitable for inoculation. He would, however, inoculate two guinea pigs from the culture obtained from the liver of the guinea pig which died July 22, and if they did not die he would venture to use this culture. I did not ask him why some of the material in his numerous Pasteur flasks in the laboratory, which had served for the inoculation of so many persons in 1886, might not serve the same purpose at present, but I was at a loss to understand how it was that my witnessing a practical demonstration of his method was to depend upon the fact whether these two guinea pigs died or otherwise. As they remained in good health, arrangements were made by Dr. Freire to practice some inoculations in my presence, on the 8th of August, a few days before the time fixed for my return home.

The inoculations were made at the drug store of the apothecary Telles, who had made the greater number of his inoculations in 1885 and 1886. Dr. Freire brought with him the agar culture referred to, made in one of the tubes I had brought with me from Baltimore. About two grams of water was poured into the tube, and the micrococci upon the surface of the agar were mixed with this by stirring with a glass rod. One-half a gram of this water with the micrococci in suspension was then injected by means of a hypodermatic syringe in the deltoid region of the arm of each of the individuals selected for the experiment.

These persons were:

(1) Pedro Bernard de Senna; a negro; aged twenty-nine years; a native of Brazil; residence Rua Misericordia No. 52. This man was under the influence of liquor when inoculated. He did return, as he promised to do, to let me see his arm on the second day after the inoculation.

(2) José Francisco da Sieva Ramos; aged thirty-four years; born in Portugal; has been twenty-five years in Brazil; residence 87 Conde d'Eu; occupation upholsterer. This man reported to me at the drug store the second day after the inoculation. His temperature was 98.94 Fah.; some tumefaction, redness, and pain on pressure at point of inoculation; says he had a little headache the night before.

(3) José Candido da Souza; aged twenty-six years; Portuguese; five months in Brazil; a baker. Not vaccinated before, and has not had yellow fever. This man returned for examination on the 10th. There was tumefaction, redness, and pain on pressure at point of inoculation. Temperature 98.3° Fahr.; no chill and no fever; says he had a little headache and malaise, but has continued at his work.

(4) Serafim Francisco dos Santos; Portuguese; aged eighteen years; four years in Brazil; a baker. Not vaccinated before, and has not had yellow fever. On reporting two days later his temperature was found to be normal. There was slight tumefaction, redness, and pain on pressure at point of inoculation; has continued at his work, and has not had any symptoms as a result of the operation except a slight headache.

As I sailed for the United States on the 11th, I was not able to see these men again, but at my request Dr. R. Cleary, an American physician practicing in Rio, witnessed the inoculations and visited the two bakers after my departure. Since my return I have received the following letter from Dr. Cleary:

RIO DE JANEIRO, August 13, 1887.

DEAR SIR: I have just returned from a visit to No. 93 Rua do Conde d'Eu to examine the two bakers, Serafim Francisco dos Santos and José Candido da Souza, who were inoculated by Dr. Domingos Freire in our presence in the apothecary shop No. 87, in the same street. The swelling at the place of puncture has entirely subsided in one of them, and almost so in the other. It is still a little hard for about the size of a dime, and slightly discolored, very slightly (extravasated blood). The temperature of the inoculated places, as well as that of the whole body, is in a normal state, as well as the tongue, pulse, and skin; in fact, they appear in perfect health. Also, he felt no pain from pressure on the place.

I am, very respectfully, your obedient servant,

R. CLEARY.

August 16, 1887.—I have again seen the bakers to-day. No more signs of the inoculation appear. They are well, and no abscess formed.

R. C.

Dr. G. M. STERNBERG, *U. S. Army.*

Since receiving the above letter I have again heard from Dr. Cleary, and quote as follows from his letter, dated January 14:

Some days ago I met in the Rua Ouvidor the apothecary at whose shop Dr. Freire made the inoculations in our presence, and he reiterated his great faith in the discovery, and that it protected from variola also. A few days afterward the authorities closed this shop as an illegal concern.

DR. FREIRE'S PROTECTIVE INOCULATIONS.

Having reviewed at length the claim of Dr. Domingos Freire to have discovered a specific yellow fever germ, and to have transmitted this disease to certain lower animals by inoculation, and having arrived at the conclusion that these claims are without scientific foundation, it may be thought that no further demonstration is required in order to show that his protective inoculations are without value. The inoculations practiced are said to have been made with cultures containing the "attenuated" microbe of yellow fever; *a priori* it would appear that if there has been no veritable discovery, and if there is no sufficient evidence that the cultures used in

making the inoculations contained the specific germ of yellow fever no value can be attached to such inoculations.

But these inoculations have been made on so large a scale, and the statistical results, as presented by Dr. Freire in his numerous publications, appear so favorable to his method that it becomes necessary to analyze these statistics; and if, as he claims, they establish the fact that the mortality from yellow fever is very much less among those who have been inoculated by him than among non-inoculated persons exposed in the same way, we will be obliged to concede the value of his method, although the rationale of this protective influence may not be apparent.

Dr. Freire has given in detail his statistics relating to his yellow fever inoculations in the following publications, which we will consider separately:

I. Rapport sur les inoculations préventives de la fièvre jaune durant l'épidémie qui a régné en 1883 et 1884, à Rio de Janeiro et présenté à S. Ex. M. le Conseiller, ministre et secrétaire d'Etat de l'Empire, par le Dr. Domingos José Freire, professeur de chimie organique et biologique de la Faculté de Médecine de Rio de Janeiro, président de la Junta Centrale d'Hygiène, etc. (Rio de Janeiro, 1885).

II. Le vaccin de la fièvre jaune. Résultats statistiques des inoculations préventives pratiquées avec la culture du microbe atténué, de janvier à août de 1885. (Rio de Janeiro, 1886).

III. Statistique des vaccinations pratiquées avec la culture atténuée du microbe de la fièvre jaune de Septembre, 1885 à Septembre, 1886. (Paris, 1887.)

In order to do full justice to Dr. Freire I shall quote extensively from these several reports. I will then state the results of my own investigations and will make such an analysis of the statistical data given as seems to me necessary in order to elucidate the truth with reference to the question as to the real value of the inoculations practiced as a protection against yellow fever.

REPORT UPON PREVENTIVE INOCULATIONS FOR YELLOW FEVER DURING THE EPIDEMIC WHICH PREVAILED IN 1883 AND 1884 IN RIO DE JANEIRO.

[Presented to his excellency the minister, councillor, and secretary of state of the Empire by Dr. Domingos José Freire, professor of organic and biologic chemistry of the faculty of medicine of Rio de Janeiro, president of the central board of health, etc.]

EXCELLENCY: The epidemic cycle of yellow fever which commenced to manifest itself in the month of October of the past year having terminated, as only sporadic cases show themselves at the present moment, I consider it my duty, having been commissioned by the Imperial Government to study this malady, to communicate to your excellency in a succinct manner the practical results of the researches which I have made since March 15, 1883, the date upon which I was charged with this task, which has been as arduous as it is flattering for me, by M. the Councillor Leão Velloso, minister of the Empire at that time.

Before occupying myself with all of the details relating to this question in the work entitled "*Doctrine microbienne de la fièvre jaune*," already in course of publication by order of the Imperial Government, I will limit myself at present to submitting to your excellency the labors which relate to the problem of preventive inoculations, the capital point and final end towards which the studies which I have undertaken have tended from the commencement.

I will make in brief chapters an exposition of the fundamental facts which have brought me to test upon the human species this means of prophylaxis and the results of this first experiment, which can already be appreciated upon a grand scale, inasmuch as the vaccinations were no sooner practiced than an epidemic of yellow fever occurred, which has carried off nearly seven hundred victims.

Basis for vaccination.

It was only after long and patient experiments upon the virulent power of the microbe of yellow fever that I was encouraged to inoculate in the human organism. I have realized from the commencement the immense responsibility which would weigh upon my conscience in case a single disaster should come to reduce to nothing the series of my deductions. I can assure your excellency that in this grave question I have proceeded with all the precaution, all the care, all the prudence required in such a case, and the proof is that up to the present time I have not had to repent of a single one of my acts tending to elucidate the problem of the prophylaxis of yellow fever, in spite of the intrigues of my adversaries and of the sad expedients to which they have resorted to satisfy their animosity against me.

I could, however, fear nothing, because I have founded my experiments upon the most certain basis of physiological experimentation and comparative pathology, and I have repeated the facts a great number of times and under the most varied forms of intensity and of animal organization.

In the first place I occupied myself in verifying the contagious nature of the malady, which I have put beyond doubt by means of inoculations of the blood of individuals attacked with yellow fever into susceptible animals; I transmitted the malady from animal to animal in the same way as in its natural evolution it is transmitted from man to man, a result which I have related in a little brochure entitled "*Études expérimentales sur la contagion de la fièvre jaune.*"

After having demonstrated the contagion not only by these inoculations, but likewise by the cadaveric examination of animals which presented lesions in every respect similar to those encountered in man, I occupied myself in seeking a proceeding for the attenuation of the microbial virus, and I remarked that after a certain number of successive cultures made with all scientific rigor the microbe lost a great part of its virulent activity and could be inoculated into the same susceptible animals which had served to demonstrate the contagious nature of the malady without producing death.

In effect, guinea-pigs which all died under the influence of direct inoculations of blood and of very virulent cultures, resisted the attenuated cultures even when they received by injection 50 centigrams or a gram at once. These animals presented only a slight elevation of temperature and loss of flesh, and other symptoms which passed away in two or three days, after which they returned to their normal condition. There exist still in my laboratory several animals inoculated more than a year ago, the health of which has not suffered.

This remarkable attenuation of the cultures has struck me so forcibly that I occupied myself immediately in ascertaining if the animals inoculated with these cultures gained, or otherwise, an immunity when injected with virulent blood drawn from individuals affected with yellow fever.

In twelve animals vaccinated several days previously with attenuated cultures, the injection of this blood did not produce death, while in other animals, not vaccinated, in which the same injection was made at the same time, death occurred in all. I am making preparations to repeat my experiments upon a greater scale during the next epidemic, in view of the fact that I have no longer any cultures which have a mortal virulence.

These twelve cases have, however, a great value for me, and as I had demonstrated physiologically in more than fifty experiments upon animals, the innocuity of the attenuated cultures, I had a foundation sufficiently secure to make me feel authorized to test upon the human species preventive inoculations with the same cultures.

Number of persons vaccinated and conditions in which they were placed.

I have practiced four hundred and eighteen vaccinations upon the human species, not only a month before the epidemic, but also during the period of its greatest intensity.

Experience has demonstrated that the most favorable conditions for being attacked and dying from yellow fever are:

(1) Absence of acclimation. It is for this reason that strangers recently arrived are most subject to be attacked, as well as natives coming from places where the disease does not reign habitually.

(2) An age comprised: (a) between sixteen and thirty years (maximum of frequency); (b) between thirty-one and forty-five years; (c) between less than one year and fifteen years. From forty-five to sixty the disease is more rare, and after sixty it is excessively rare.

(3) A strong constitution, which corresponds with the limits of age already stated.

(4) Bad hygienic conditions, above all the agglomeration of persons offering these conditions of receptivity in non-hygienic habitations.

I have sought to vaccinate only individuals included in these conditions of morbid receptivity. The four hundred and eighteen persons vaccinated may be classified as follows:

First. Age.—From sixteen to thirty years, 241 (maximum intensity); from thirty-one to forty-five years, 94 (intermediate intensity); from less than one year to fifteen years, 64 (intermediate intensity); from forty-six to sixty years, 13 (minimum intensity); without declaration of age, 6; total, 418.

Second. Nationality.—Portuguese, 158; Italians, 122; French, 11; Spanish, 9; English, 1; German, 1; Swiss, 1; North American, 1; Argentine, 1; Holland, 1; Pole, 1; Brazilians, 111.

Important observation.—The 111 Brazilians came, with rare exceptions, from the high plateaus (interior of the Province of Rio de Janeiro) or from the provinces of the south, from Minas, Geraes, San Paulo; a few from the provinces of the north. They were then all in the most favorable conditions of morbid receptivity.

Third. Time in Brazil.—A few days, 39; from one month to one year, 166; from two to five years, 114; more than five years, 26; total, 345.

There are seventy-three persons for whom no statement is made as to time of residence in Brazil, but in this number is included many children of a few months or years of age.

The greater number of those vaccinated inhabited the *estalagens** and lived in the quarters where the disease habitually prevails with the greatest virulence; that is to say, at Cidade Nova, in the center of commerce, and the littoral from the beach of Santa Lucia as far as Botafogo, throughout its extent and in its vicinity.

I vaccinated in Vassouras thirty-seven persons; but these persons had to visit Rio during the epidemic season, and for this reason desired to protect themselves. Besides, it is known that recently deadly epidemics of yellow fever have broken out at Vassouras, and it appears that several sporadic cases have already occurred this year. For this reason I could not and ought not to neglect as a statistical element the vaccinations made at Vassouras.

Result of the vaccinations.

During the epidemic season a great number of those vaccinated were attacked by the disease, but in a manner quite benign. At the termination of the epidemic we have ascertained that up to the time of presenting this report more than six hundred and fifty persons not vaccinated have died of yellow fever. On the other hand, seven persons among the vaccinated appear in the lists of deaths as having died of the malady, and even of these there are well-founded doubts as to the correctness of the diagnosis in different cases; for this reason I ought to call your excellency's attention to the fact that I have only been able to verify the diagnosis in two of these cases.

Let us admit, however, that the number of deaths has been seven; even then the percentage of deaths will be very favorable since it will be scarcely 1.6 per cent.

* * * * *

This statement of results is followed by a further discussion of the ages and nationality of those vaccinated, and a comparison with the ages and nationality of those included in the list of deaths. Following this is a list of the names of the vaccinated, in which is included a statement of the age, nationality, residence, and time of residence in Brazil. This is followed by a list of the names of those who died from yellow fever in Rio de Janeiro between the months of October and May, 1884. In this list, also, the name, nationality, and residence is given.

We remark, first, that, in selecting foreigners, and, preferably, those who had recently arrived in Brazil, for his first experimental test as to the efficacy of his protective inoculations, Dr. Freire has given evidence of his confidence in the method of prophylaxis proposed, and of an honest desire to demonstrate its value, and nothing could be more fair than his full publication of the names and of the essential facts with reference to these persons. I must object, however, to his including in his statistics the names of thirty-seven persons residing in Vassouras, a village which is some 50 miles distant from Rio de Janeiro. Even if these persons had occasion to visit Rio during the epidemic season, as is stated by Dr. Freire, it is probable that they would remain as short a time as possible, and there is no evidence that they were fairly exposed to the epidemic influence. Moreover, if any of these persons had contracted yellow fever as a result of a visit to Rio, their names would not appear in the mortality lists of this city, but in those of Vassouras, which are not given. The latter objection applies also to fourteen persons among the vaccinated whose place of residence is Niteroy, a town upon the Bay of Rio de Janeiro, which is the capital of the province of the same name; two persons vaccinated at Tijuca and one on board the bark *Flirc*, two at Pavina and three at Serraria, must also be excluded. This reduces the number of vaccinated persons within the city limits to three hundred and fifty nine; and, of this number, a certain proportion, no doubt, left the city soon after being vaccinated, and before any exposure worthy of consideration in a test of this kind had occurred.

Dr. Freire admits that, "during the epidemic season, a great number of the vaccinated were attacked by the malady;" but claims that these attacks were of a mild

* Small apartments where the laborers, and especially those of foreign origin, are crowded together.

character; yet he gives us the names of seven vaccinated persons who died from the disease. This list has been added to by some of Dr. Freire's confrères, as will be seen by the following translation of a letter published in one of the newspapers of Rio, and bearing date May 5, 1837. This letter is signed by Dr. Aranje Góes, at present a member of the central board of health, and a gentleman whose statements are worthy of the fullest confidence.

My letter to the Imperial Academy of Medicine having been published, it now behooves me to publish the statistics relating to the vaccinations on Morro da Viuva.

One fact seems to me to be definitely demonstrated, that is the *worthlessness of Dr. Freire's vaccination*, as is well known to the medical profession of this city.

A year ago I wrote the following:

"The want of skill which he displayed in his first experiments, the false conclusions which he has drawn therefrom, and the thoughtless precipitation with which he has hastened to make known incomplete results without accompanying them with a single qualifying remark vitiate all the methods to which he may hereafter resort to corroborate his statements." (Jornal do Commercio, April 20, 1833.)

The mortality among the persons vaccinated on Morro da Viuva furnishes one more proof that I was right in saying this, as I now proceed to demonstrate.

There were vaccinated in this district sixty persons. Sixteen removed shortly after the commencement of the epidemic, and forty-four remained exposed to its influence. Of these twenty-two had the yellow fever, nine of whom died.

The following is a list of the vaccinated persons who had the fever, the names of those who died being marked with an asterisk:

Antonio de Oliveira,* Antonio Bento da Silva, Albino Francisco Maia, José da Silva, Joaquim Pereira de Souza,* Joaquim Gomes de Azevedo, Joaquim Ferreira Tollo, José Seabra dos Santos, José Ventura, José de Souza Ferreira,* José Gomes de Azevedo, jr., José Farinha, Manoel Joaquim Pereira Lopes, Manoel Gomes de Azevedo, Manoel Antonio,* Seraphim Gonçalves Raymundo, Manoel Simões,* Thomé Simões, Manoel da Silva Alves,* Antonio Pereira Neves,* Joaquim Martins Pinheiro,* Joaquim Antonio dos Santos Cardoso.*

Consequently, of the forty-four vaccinated persons who remained in the locality, twenty-two, that is 50 per cent., had the yellow fever.

Of the twenty-two patients nine died, that is 40.9 per cent.

In the Jurujuba Hospital, which receives scores of patients already dying or in the third stage of the disease, the mortality is only 21 per cent.

It may also be of some interest to the English admiralty which, through ignorance or inhumanity, is very backward in publishing the translation of Dr. Freire's pamphlet.

Seriously, of what use is this vaccination? It serves to discredit in foreign countries the science and even the good sense of the Brazilians.

The competent, the veterans of microscopic investigation, who after two or three years of daily labor only dare in matters of this kind to give modest utterance to a simple hope, can not refrain from smiling at the achievements of Brazilian *sages*, who after two or three months' study solve the most difficult etiological and prophylactic problems relating to the most complicated diseases.

Since the mortuary statistics of the Morro da Viuva have been made known, his excellency, the minister of the Empire, and the honorable board of health can no longer cover with the mantle of their authority the repeated announcements eulogizing the ignorant and imprudent to be vaccinated with the microbial liquid.

Let the Morro da Viuva be the Waterloo of Dr. Freire alone.

DR. ARANJO GÓES.

MAY 5, 1834.

Upon comparing the names given by Dr. Góes with those in Dr. Freire's published list of persons vaccinated, I fail to find the following names: Joaquim Pereira de Souza,* Joaquim Gomez de Azevedo, Manoel Gomes de Azevedo, Manoel Simões,* Manuel da Silva Alves, Antonio Pereira Neves.*

On the other hand, Dr. Freire gives the name of Thome Simões as having died, while his name appears in Dr. Góes list without the asterisk, which designates a fatal case. Again Dr. Freire gives the name Celestina Felitte as one of the fatal cases conceded by him, but I do not find this name in his list of persons vaccinated.

In a second letter published in the Gazeta de Noticias (May 8, 1834), Dr. Góes criticises Dr. Freire's statistics as follows:

* * * * *

Ever since Dr. Freire, with such boldness and precipitation, spread to the four points of the compass the news of his famous discovery of vaccination for the preven-

tion of yellow fever, all of his professional brethren, even the most incompetent, have been entitled to investigate and criticise his experiments and theories, and it is his place to answer all objections which may be raised. To ask the public to suspend its decision, to postpone the refutation of the arguments against him, to equivocate, and to alter facts to suit his purposes, all this is a sign of weakness and a tacit confession of defeat.

The vaccination question may be divided into two parts, the first relating to the percentage of vaccinated persons attacked by the fever, and the second to the mortality among those attacked. Dr. Freire, being unable to deny that of forty-four persons vaccinated on Morro da Viuva twenty-two had the yellow fever, resorts to a subterfuge. He embraces in his statistics all who were vaccinated with the microbian liquid, whereas he should have included only those exposed to the influence of the epidemic.

For instance, of the sixty persons vaccinated on Morro da Viuva sixteen removed to other localities.

Dr. Freire does not deduct from the whole number the fifty or sixty persons vaccinated in Vassouras. He makes no deduction of Brazilians or foreigners who have long resided in the country. Neither does he deduct persons who have left the city and gone to Minas, St. Paulo, etc. He considers the whole number as four hundred and fifty, and thus arrives at a death-rate of 2 per cent. It is evident, then, that it is Dr. Freire that vitiates the calculation, including therein vaccinated persons absent from the city, and consequently out of reach of the epidemic.

This mode of reasoning does not indicate scientific candor, and it deserves the severest censure. The death-rate of 2 per cent. is altogether fictitious.

* * * * *

As long as Dr. Freire is unable to dispute my figures, he is forced to acknowledge the correctness of my conclusion that his vaccination is good for nothing.

DR. ARANJO GÓES.

MAY 7, 1884.

Dr. Freire's statistics have also been severely criticised in the Imperial Academy of Medicine of Brazil, as will be seen by the following translation of an address made by Dr. Nuno de Andrade, inspector-general of hygiene of the ports of Brazil.

The translation is from the published bulletin of the academy, and the address was made at the meeting of July 14, 1885:

In the second part of the order of the day the question discussed was yellow fever. Dr. Nuno de Andrade, taking the floor, said that there was not sufficient time for a thorough discussion of the question of Dr. Freire's inoculations for the prevention of yellow fever, and it was necessary for the academy to hear different opinions and not alone those of the speaker who had already, at previous meetings, occupied its attention. He would, therefore, make his remarks as concise as possible.

* * * * *

But, passing over all these incidents, the speaker proceeded to explain to the academy Dr. Freire's singular method of arranging statistics to prove the efficacy of his preventive inoculations.

To impress the Government with the idea that these inoculations had produced a wonderful effect, Dr. Freire sent to the department of the Empire a nominal list of the persons he had vaccinated and also a list of the deaths caused by yellow fever in this city in 1884. On examining these lists, says Dr. Freire, it will be seen that of the four hundred and eighteen persons vaccinated only seven, whose names he gives, have died.

The speaker said that he felt at a loss to estimate correctly the value of these lists. In the first place the list sent to the Government differs from that which Dr. Freire sent to the *Gazeta de Noticias*. Dr. Freire vaccinated four hundred and eighteen persons, but the list sent to the Government contains only four hundred and fourteen names. The names wanting to complete the number of four hundred and eighteen, were those of Antonio Gonçalves Martins, Camillo Lange, Felicio Rogeri, and Victor Saizenzi. But it was likewise to be noted that Dr. Freire, having vaccinated fifty-nine Portuguese on Morro da Viuva, as may be seen by the list sent to the *Gazeta*, included in the list sent to the Government the names of only forty-nine. Consequently he had failed to account for ten, whose names are as follows: Brazda Silva Souto, Joaquim Gomes, Joaquim Gomes de Azevedo, José Pereira Lessa, João Ferreira Vianna, José Monteiro dos Santos, Manoel Raymundo, Manoel Gomes de Azevedo, Manoel Ferreira, Seraphim Ferreira.

Including these ten, the number of persons vaccinated would be four hundred and twenty-eight; but as Dr. Freire only vaccinated four hundred and eighteen, it is to be supposed that the ten names omitted were replaced by ten others. These the speaker would give afterwards.

One of the ten vaccinated persons whose names had been overlooked when the list was prepared for the Government, the Portuguese Manoel Ferreira, twenty-three years old, residing on Morro da Vinva, died of yellow fever, as may be seen in the obituary list. It is necessary, therefore, to add this death to the seven given by Dr. Freire, and also that of Joaquim Antonio Cardoso and that of José de Souza Ferreira, making ten altogether.

It is impossible to say, with certainty, whether those ten are the only ones who died, for in Dr. Freire's lists some of the names are altered and do not agree with those in the obituary list.

For instance, the last-mentioned name, that of José de Souza Ferriera, was included in the list of persons vaccinated, together with a description of the person to whom it belonged, whereas, in the obituary list sent by Dr. Freire to the Government, while the description remains unchanged, the name is altered to José de Souza *Fonseca*. Examining the obituary lists published in the daily papers, the speaker found in the *Jornal do Commercio*, of April 5, 1884, among the deaths of March 31, that of José de Souza *Ferreira*, just as it is in the list of vaccinated persons, and not *Fonseca* as it is in the obituary list which Dr. Freire sent to the Government.

The speaker said that he mentioned these facts not only to justify his own doubts, but also to show how carelessly Dr. Freire had done his work. The process of manufacturing statistics discovered by Dr. Freire exceeded anything the speaker had ever deemed possible, for his statistics for Rio de Janeiro in 1884 were prepared with data obtained in Senegal in 1881. What Dr. Freire proposed to ascertain was whether in 1884 the number of deaths in Rio de Janeiro, in proportion to that of the persons liable to take the yellow fever, was greater or not than that of the deaths among vaccinated persons in proportion to the whole number vaccinated. With this object in view he said: "In Senegal, in 1881, of four foreigners with less than three years' residence in the country three had the yellow fever, and of these two died; therefore the proportion of cases of yellow fever was 75 per cent., and the mortality among the patients was 66.6 per cent. In Rio the mortality in 1884 was 35 per cent.," *ergo*, reasoned Dr. Freire, 35 (of Rio): 66.6 (of Senegal) :: x (of Rio): 75 (of Senegal). In this calculation, whose wonderful ingenuity had greatly impressed the speaker, $x = 39.4$. "Thus," concluded Dr. Freire, "in Rio de Janeiro, in 1884, of every 100 persons liable to have the yellow fever 39.4 were actually taken with it; and as the mortality was 35 per cent., represented by 654 deaths, the whole number of patients was 1,873." Wishing to learn next how many persons there were in Rio, in 1884, liable to have the yellow fever, Dr. Freire established the following proportion:

$$39.4 : 100 :: 1873 : x.$$

Therefore $39.4 x = 187,300$, and $x = 4,737$. Hence Dr. Freire concludes that in 1884 there were in Rio de Janeiro only 4,737 persons liable to have the yellow fever, and that of these 654, or 13.7 per cent., died, while of the 418 vaccinated there died only 7, or 1.6 per cent.

From this he infers that the result of his preventive vaccinations is really wonderful. (Page 181 of "Appendix to the Doctrine Microbienne.")

The speaker, however, preferred omitting the statistics of Senegal and making use only of those of Rio. Deducting, then, from Dr. Freire's list of vaccinated persons those who had more than three years' residence, and those residing in Vassouras and Serraria, the number of those liable to have the fever, according to the theory advanced in Dr. Freire's calculation, is reduced to three hundred and forty. Among these there were ten deaths, *i. e.*, a mortality of 2.9 per cent.

The number of foreigners who arrived in Rio de Janeiro in 1880, 1881, and 1882 was 66,628, all liable, according to the aforesaid theory, to have the fever.

This number, which is taken as a basis for the calculation, said the speaker, is not exaggerated, for if it be true that many of these persons did not remain in the city, it is also true that the calculation does not include the tens of thousands of sailors on board the vessels in port, nor the persons newly arrived from the country, nor the children residing here, who are unfortunately paying a heavy tribute to the epidemic.

Very well, the 654 deaths from yellow fever among the 66,210 persons liable to take the disease (66,628—418 vaccinated by Dr. Freire) represent a mortality of 1.01 per cent, which is much smaller than the mortality among the vaccinated.

At this point the speaker said that owing to his fatigue and to the lateness of the hour he would, for the time, terminate his address.

Upon my arrival in Rio I determined to make an attempt to ascertain the results, up to date, of the inoculations practiced by Dr. Freire in 1884, and included in the list published in his report at present under consideration. For this purpose I secured the services of Mr. Slaughter, a native of the United States, who has resided in Brazil more than twenty years, and has become a naturalized citizen of that country. I instructed Mr. Slaughter to visit each address in the published list, for the purpose of

making inquiries with reference to the vaccinated person and ascertaining, if possible, whether he had suffered an attack of yellow fever subsequently to the date of his vaccination.

The general result of this investigation is as follows:

Total number of vaccinated persons in Dr. Freire's list.....	414
Did not reside in Rio at time of vaccination	59
Full address not given, and no visit made in consequence of this fact.....	82
Not visited because of remoteness of dwelling and insufficient time	76
Visit made to address given and no information obtained.....	111
	328
Remaining.....	86

Of those remaining, information was obtained as follows:

Continue to reside in Rio and have not suffered from yellow fever since vaccination	30
Have suffered non-fatal attacks of yellow fever *	15
Have suffered fatal attacks of yellow fever *	10
Have removed from Rio, and did not suffer an attack, so far as could be ascertained before removal.....	23
Have removed from Rio, and are said to have suffered an attack of yellow fever since vaccination	3
Have died since vaccination: Of consumption, one; died after four days' illness, informant does not know cause of death or name of attending physician (No. 143); died December 29, 1883, one or two months after vaccination, informant does not know the cause of death (No. 410); is said to have died, no further information obtained (No. 349); total.....	4
Had yellow fever before vaccination.....	1

In addition to the ten fatal cases of vaccinated person included in the above list, Dr. Freire reports the name of Celestina Felitte, which does not appear in his published list, and Dr. Goes the names of Joaquim Pereira de Souza, Manoel Simões, Manoel da Silva Alves, and Antonio Pereira Neves.

The evidence above recorded seems to the writer to be convincing as to the complete failure of Dr. Freire's proposed method of prophylaxis as practiced in 1883 and in 1884. We can not, however, leave the question here, inasmuch as a modification of the method was adopted in 1884 and a large number of persons have been since inoculated by this modified method. Dr. Freire says in his report under consideration: "I have employed in nearly all of the vaccinations the endermic method, and it is only recently that I have injected into two persons the same cultures by the hypodermatic method." * * * "I shall hereafter give the preference to the last-mentioned method, because one is more sure that the liquid employed goes to exercise its preservative influence."

STATISTICAL TABLES OF THE INOCULATIONS PRACTICED FROM JANUARY TO AUGUST, 1885 (CITY OF RIO DE JANEIRO).

I. NATIONALITY.

Brazilians	2,186	Foreigners:	
Foreigners:		Austrians.....	2
Portuguese.....	640	Greek.....	1
Italians.....	124	Paraguayans.....	20
Spaniards.....	22	Africans.....	4
French.....	14	North Americans.....	5
English.....	9	Chinese.....	2
Belgians.....	2	Hollander.....	1
Germans.....			

* The names given by Dr. Góes of cases occurring among vaccinated persons on Morro da Vinva are included; also the fatal cases reported by Dr. Freire.

Among the 2,186 Brazilians are included about forty negroes and mulattos.

Observations.—Total vaccinated, 3,051, viz, 2,186 natives and 865 foreigners. Among the natives are included 625 sons of foreigners of low age and having the two conditions of receptivity, which place them almost upon the same level with foreigners. A great number of the natives came from distant provinces, the climate of which is more temperate. They all inhabited the quarters infected by yellow fever.

The children of foreigners are of the following parentage:

II. CHILDREN.

Portuguese.....	545	French.....	3
Spaniards.....	9		
Italians.....	49	Total.....	625
Germans.....	19		

III. AGES.

Below 10 years.....	1,697	From 51 to 60 years.....	41
From 11 to 20 years.....	585	Over 60 years.....	4
From 21 to 30 years.....	348	Unknown.....	1
From 31 to 40 years.....	238		
From 41 to 50 years.....	137	Total.....	3,051

Observation.—It will be seen that the great majority of the persons vaccinated are within the limits of age most inclined to yellow fever. There are included a very considerable number of young children.

IV. TIME OF RESIDENCE IN BRAZIL.

A few days.....	26	Five years.....	103
A few months.....	71	On board ship (de passage).....	9
From one year to a year and a half..	69	More than five years.....	256
Two years.....	107		
Three years.....	98	Total.....	865
Four years.....	126		

Observations.—The nine individuals on board ship remained a long time exposed to the epidemic influence. Among the two hundred and fifty-six strangers who had remained more than five years we count a considerable number who have arrived in Brazil within six or seven years, that is to say, within the limits when they are still very susceptible. Besides, immunity is never absolute as a result of long residence in an infected country. Thus the individuals who are in this category afford each year a contingent, small, it is true, to the general mortality.

STATEMENT OF HOUSES AND STREETS WHERE DEATHS OCCURRED FROM YELLOW FEVER AND IN WHICH INOCULATIONS WERE PRACTICED THE DAY THE DEATH OCCURRED OR A FEW DAYS BEFORE OR AFTER.

1. Rua de Riachuelo.

No. 205. Vaccinations.....	5
Died not vaccinated.....	1
No. 39. Vaccinations.....	35
Died not vaccinated.....	2
No. 43. Vaccinations.....	19
Died not vaccinated.....	1
Vaccinated in the adjoining house, No. 45.....	1
No. 199. Vaccinations.....	3
No. 188. Vaccinations.....	1
No. 172. Vaccinations.....	2
No. 189. Dead not vaccinated.....	1
No. 192. Dead not vaccinated.....	1
No. 195. Dead not vaccinated.....	1
No. 119. Vaccinations.....	12
No. 114. Dead not vaccinated.....	1

Vaccinations were also practiced at Nos. 274 (1), 260 (2), and 3 (5).

En résumé.—Vaccinations practiced in Rua Riachuelo, 114; died not vaccinated, 15. We have only mentioned those vaccinated who resided in the vicinity of individuals who died or in the same house. The same method will be followed for the other streets. Sixteen cortiços in this street.

2. *Rua de Comte d'Eu.*

No. 79. Died not vaccinated	1
No. 97. Died not vaccinated	1

In Nos. 87, 93, 85, 91, in the vicinity of the above, were living a considerable number of vaccinated persons, as may be verified by referring to the tables relating to place of residence.

No. 105. Died not vaccinated	1
Vaccinated	1
No. 107. Vaccinated	2
No. 109. Vaccinated	1
No. 147. Died not vaccinated	1
Vaccinated	1
No. 103. Vaccinated	5
No. 133. Vaccinated	5
Died not vaccinated	2
No. 151. Vaccinated	1
No. 195. Died not vaccinated	1
No. 199. Vaccinated	2
No. 208. Died not vaccinated	1
No. 205. Died not vaccinated	3
No. 198. Vaccinated	10

Résumé.—Vaccinations practiced in Rua Comte d'Eu, 300; died not vaccinated, 8.

3. *Rua José Bernardino.*

No. 1. Died not vaccinated	1
Vaccinations	2

4. *Rua Itapiru.*

No. 61. Died not vaccinated	1
Vaccinations	4
No. 63. Vaccinations	1
No. 49. Died not vaccinated	3
Vaccinations	4
No. 45. Vaccinations	20

Résumé.—Vaccinations practiced, 33; died not vaccinated, 4.

5. *Rua 2 Décembre.*

No. 52. Died not vaccinated	5
Vaccinations	7
No. 50. Vaccinations	4
No. 54. Died not vaccinated	3

In other houses in the same street, 4 vaccinations were made.

Résumé.—Vaccinations, 15; died not vaccinated, 8.

6. *Rua de Vicomte d'Itauna.*

No. 87. Vaccinations	11
Died not vaccinated	1

In Nos. 86, 73, 75, 13, in the vicinity of the above there were eight deaths of unvaccinated persons. In the neighboring houses and throughout the extent of the same street we made one hundred and six vaccinations.

Résumé.—Vaccinations, 106; died not vaccinated, 4.

7. *Rua St. Christophe.*

No. 34. Vaccinations	5
No. 42. Died not vaccinated	1
Nos. 77, 89, 91. Died not vaccinated	3
Nos. 71, 66, 64. Vaccinations	6
Nos. 38 and 44. Vaccinations	11
Nos. 22, 28, 21. Vaccinations	35
No. 18. Died not vaccinated	1

Résumé.—Vaccinations, 58; died not vaccinated, 5.

8. *Rua Laranjeiras.*

No. 37. Died not vaccinated	2
No. 39. Vaccinations	3

9. *Rua Comte de Bomfim.*

No. 7. Vaccinated	20
Died not vaccinated	1
Nos. 3 and 10. Vaccinated	4
<i>Résumé.</i> —Died not vaccinated 1; vaccinated, 50.	

10. *Rua des Invalides.*

No. 77. Vaccinations	7
Died not vaccinated	1
No. 94. Died not vaccinated	1
No. 97. Vaccinations	3
Nos. 105 and 107. Vaccinations	11
No. 26. Died not vaccinated	1
<i>Résumé.</i> —Vaccinations, 98; died not vaccinated, 3.	

11. *Rua e Largo de Catumby.*

No. 58. Vaccinations	3
Died not vaccinated	1
No. 11. Vaccinations	11
No. 413. Died not vaccinated	1
<i>Résumé.</i> —Vaccinations, 22; died not vaccinated, 2.	

12. *Rua Lavradio.*

No. 53. Vaccinations	7
Died not vaccinated	1
No. 51. Vaccinations	10
No. 45. Vaccinated	9
No. 63. Died not vaccinated	1
No. 132. Died not vaccinated	1
<i>Résumé.</i> —Vaccinations, 31; died not vaccinated, 3.	

13. *Rua Floresta.*

No. 14. Vaccinated	1
No. 44. Died not vaccinated	1
No. 14. Vaccinations	6
Nos. 26 and 35. Died not vaccinated	2
<i>Résumé.</i> —Vaccinations, 7; died not vaccinated, 3.	

14. *Rua Leopoldo.*

No. 6. Vaccinations	13
Died not vaccinated	1
No. 21. Vaccination	1
Died not vaccinated	1
No. 19. Vaccinations	16
No. 17. Vaccinations	10
No. 71. Vaccinations	4
Died not vaccinated	1
Nos. 83 and 85. Vaccinated	2
No. 59. Vaccinated	5
No. 61. Died not vaccinated	2
No. 28. Died not vaccinated	1
<i>Résumé.</i> —Vaccinations, 114; died not vaccinated, 6.	

15. *Rua de Areal.*

No. 1. Vaccinated	4
Died not vaccinated	1

Observations.—We could multiply these observations, but we think that they are sufficient to demonstrate clearly the immunity enjoyed by those inoculated. In effect, among nine hundred and fifty-two vaccinations practiced in the epidemic centers, in the same houses from which the dead had been brought out to the number of sixty-six, there was not a single death among those vaccinated.

General résumé.—Vaccinations practiced from January to August, 1885, 3,051; died not vaccinated, 278; died vaccinated, 0.

Dr. Freire has omitted to state one very important fact with reference to vaccinations practiced during the period included in this tabular statement. The date of the vaccinations is not given. Fortunately I am able to supply this omission from

his journal containing the names of the vaccinated, which he kindly placed in my hands during my stay in Rio. I find from this record that the inoculations were practiced as follows:

January	392	May	273
February	342	June	813
March	611	July	481
April	139		

Now, it is well known that June and July are months during which yellow fever does not prevail in Rio, and that, in fact, the month of May furnishes as a rule but few cases.

The exposure even in an epidemic year amounts to very little during the months of May, June, and July, and may be considered practically *nil* in a year like 1885, when the whole mortality was only 278 in a city of 400,000 inhabitants. But Dr. Freire has included in his list 1,294 persons who were vaccinated during the healthy winter months of June and July, and who presumably had been exposed during the preceding comparatively unhealthy months of January, February, March, and April. If these 1,294 individuals were protected from an attack of yellow fever by the inoculation practiced in June or July, what protected them from being attacked during the preceding epidemic season? We must insist upon excluding these 1,294 persons from consideration during the year 1885, to which the report under review relates, and we think that it would be quite proper also to exclude those inoculated during the month of May, but will not insist upon this point. We have then to consider the value of the evidence offered by Dr. Freire as regards 1,757 inoculated persons instead of 3,051 included by him in his statistics for the year.

We remarked with reference to those persons selected for vaccination in 1883 and 1884, that "in selecting foreigners, and preferably those who had recently arrived in Brazil, for his first experimental test of the efficacy of his protective inoculations, Dr. Freire has given evidence of his confidence in the method of prophylaxis proposed and of an honest desire to demonstrate its value."

In his inoculations practiced in 1885 we no longer find any evidence of such selection, and, so far as we can judge, the vaccinated persons simply represent the average population of the city of Rio. It is well known that this population includes a large number of persons of foreign birth and especially of Portuguese. The whole foreign-born population probably does not fall below 100,000 persons, but I have not been able to obtain any exact statistics with reference to this point. Dr. Freire vaccinated 2,186 natives and 865 foreigners. Let us assume for the present that the 1,757 persons vaccinated by him during the months of January, February, March, April, and May were comparable so far as susceptibility to yellow fever is concerned with 300,000 of the population of Rio. In this estimate we exclude 100,000 of the population, on the supposition that this number may have enjoyed immunity as a result of having suffered an attack of the disease; 278 deaths in a population of 300,000 gives less than 1 death per 1,000, and there should not have been over 2 deaths among the 1,757 persons inoculated by Dr. Freire during the months of yellow-fever prevalence.

Let us look at the matter in another light. Dr. Freire gives the following table showing the length of residence in Brazil of the foreigners inoculated in 1885:

For a few days	26
For a few months	71
From one year to one year and a half	69
Two years	107
Three years	98
Four years	126
Five years	103
On board ship (de passage)	9
More than five years	256
Total	865

These figures also include the foreigners vaccinated in the healthy months of June and July, and those temporarily in the city (a few days, 26; on board ship, 9), but they will serve our present purpose, which is to call attention to the fact that 759 of the total number given had been in Brazil (and presumably in Rio) more than a year and a half, and had consequently passed through the preceding epidemic year (1884) without contracting yellow fever. If these persons resisted yellow fever during an epidemic in which the number of deaths amounted to 1597, how can it be claimed that they are protected by a vaccination made in 1885, when only 278 deaths occurred, scattered about (sporadic) in a city of 400,000 inhabitants? The same argument applies with greater force to the 359 foreigners inoculated who had resided in Brazil for five years and above (five years, 103; more than five years, 256). Unless the list includes persons who had already suffered an attack of yellow fever, these individuals had passed through the epidemic of 1880 (1,623 deaths) as well as that of 1883 and 1884, without contracting the disease, and we can hardly ascribe their immunity in the comparatively healthy year, 1885, to Dr. Friere's inoculation.

Another important factor in estimating the value of Dr. Freire's statistics is brought out by comparing the ages of those who died of yellow fever during the year 1885 with the ages of those vaccinated. This we have done in the following table, in which the figures as regards the ages of those vaccinated are taken from Dr. Freire's report for 1885, now under review :

Age.	No. vaccinated.	Deaths not vaccinated.
Below ten years	1,697	54
Eleven to twenty years.....	585	54
Twenty-one to thirty years	384	95
Thirty-one to forty years	238	55
Forty-one to fifty years.....	137	13
Fifty-one to sixty years.....	41	4
Over sixty years.....	4	1
Unknown	1	.....
Total	3,051	278

This table shows that 55 per cent. of the vaccinated persons were below ten years of age, while the mortality for those below ten was only 19 per cent. of the total mortality. Or taking the age which gives the largest mortality, we find that only 12 per cent. of the whole number vaccinated were between the age of twenty-one and thirty, while 34 per cent. of the fatal cases were between twenty-one and thirty years of age. It is evident then that the very large proportion of children vaccinated is an element in favor of Dr. Freire's statistics, and not favorable to a fair test of his method of prophylaxis. I find by referring to his records that a considerable number of these children were infants from a few months to two years of age. Even during the prevalence of an epidemic the mortality among such young children is almost *nil*.

Again, if a certain number of deaths had occurred among these young children, it would be a difficult matter to verify the fact. Leaving aside the question of a possible mistake in diagnosis, or an intentional concealment of the cause of death, which is quite common among the class of people inhabiting the cortiços, in which most of Dr. Freire's inoculations have been made, verification is rendered impossible in many cases by the circumstance that the vaccinated persons have remained but a short time in the apartments occupied at the time they were vaccinated, and that the names given in Dr. Freire's lists are in many instances insufficient for their identification. Thus I find in Dr. Freire's record for 1885 and 1886 no less than three hundred and eighteen single names, and of these the name Maria appears fourteen times, Antonio eight times, Joaõ seven times, José five times, etc. The ages of the nine entries made under the name Antonio are seven months, eight years, six months, seven years, three months, one year, four years, one and one-half years. In addition to this

there are many double names which are so common as not to serve for identification. The difficulty of obtaining information with reference to the vaccinated persons, and the fact that the addresses given in Dr. Freire's lists can not be depended upon, for identification, when comparison is made with the mortality lists of the city, is illustrated by the results of Mr. Slaughter's investigations heretofore reported, and by my own researches.

In company with Dr. R. Cleary, an American physician, who has been for many years in Brazil, and is now engaged in the practice of his profession in this city, I have visited a large number of the addresses given in that portion of Dr. Freire's report, which has been quoted in full, in which he gives the street and number of the houses in which his vaccinations were made. I did not have time to visit all of the addresses given, but selected those in which a considerable number of vaccinations had been practiced.

Before giving a summary of the results of this investigation it will be well to say something of the *cortiços* or *estalagens* in which most of the vaccinated persons resided. These are the tenements of the poorer classes of the population, and consist of one or two story houses, arranged in parallel blocks, facing each other, on the two sides of a long open court or alley, which is entered from the street by a large door or open gate-way. The *cortiços* vary very much as to the character of the houses and as to their sanitary condition. Some of them seem to be occupied by industrious, healthy looking laboring people; many by laundresses who occupy the open court in the prosecution of their industry; others by itinerant peddlers, beggars, and all sorts of people from the lowest stratum of the social scale.

I obtain the following information with reference to these *cortiços* from a report made by the Baron'de Ibituruna, inspector-general of hygiene, and published in 1886.

There are in all over eleven hundred *cortiços* in the city, containing over fifteen thousand separate *quartos* or apartments. The inspector-general of Hygiene gives a very dark picture of the sanitary condition of many of these *cortiços*. Thus he says of the three hundred and ninety-two located in the parish (*freguezia*) of Sant'Anna:

"The condition of the *cortiços* in this vicinity causes amazement, if not horror. There are here tenement courts for which yellow fever has a decided predilection. There are not less than three hundred and ninety-two of these centers of infection. In some men, women, children, mules, and cows live as in the primitive times of Noah's Ark; 4,241 rooms, of which 501 are made of boards, 1,135 in the worst possible condition, and 2,464 in ordinary condition."

Dr. Freire dwells upon the unsanitary condition of these *cortiços* and upon the fact that his vaccinations have been largely practiced in these centers of infection, as he considers them. It must be admitted that such unsanitary conditions and the aggregation of masses of people in ill-ventilated apartments are favorable to the extension of yellow fever, when other essential factors required for the production of an epidemic are present. But we must call attention to the fact that in 1885 these other factors were absent, as only 278 deaths occurred in a population of 400,000 souls. A very large proportion of these deaths did not occur in the *cortiços*, and no doubt a considerable number were among sailors from foreign ports, who always furnish a large contingent to the mortality list in non-epidemic years. But suppose the entire mortality had been distributed in the *cortiços*. There are 1,100 of these, and if the 278 fatal cases had occurred in 278 of these *cortiços*, one in each, we would have left 822 *cortiços* in which no fatal case of yellow fever occurred. Let us turn now to Dr. Freire's detailed account of the houses and streets in which vaccinations were made.

1. *Rua de Riachuelo.*

No. 205: Vaccinated.....	5
Died not vaccinated	1

Upon visiting this *cortiço* I was informed that no cases of yellow fever had occurred either among the vaccinated or the unvaccinated since the vaccinations were

made. My informant insists that only two were vaccinated. I did not inquire as to the total population of this and other cortiços visited, but the report of Barão de Ibituruna gives the following information with reference to the parish in which this street and the next one in Dr. Freire's list (Comte d'Eu) are situated. In this parish there are 125 cortiços; of these 46 have more than 20 tenements (*quartos*), 26 more than 30, and 18 more than 40. If the average number of tenants for each *quarto* was but three we would have at least sixty persons in each, and in No. 205, at present under consideration, there should be at least fifty-five unvaccinated persons placed under the same conditions as the five vaccinated. These persons did not contract yellow fever, or at least did not die, notwithstanding the fact that a fatal case is reported by Dr. Freire to have occurred at this number.

Dr. Freire's whole argument is based upon the supposition that yellow fever is transmitted by personal contagion, and that the persons vaccinated by him were subjected to a satisfactory test because they lived in the vicinity in which a fatal case of yellow fever had occurred. For me this argument has no weight, as I do not believe that the disease is contracted by contact with the sick. It would be quite as reasonable to vaccinate persons in New York City in tenement houses in which a fatal case of typhoid fever had occurred, or in other houses in the neighborhood, and to claim that they were protected from this disease because they did not contract typhoid fever after being vaccinated.

In our laboratory experiments we are in the habit of preserving one or more animals as a control. If, for example, I inoculate a certain number of animals with the expectation that a certain result will be produced, I place beside them under identical conditions one or more *uninoculated* animals of the same species to serve as a control. If the inoculated animals die and the control animals also die, or *vice versa*, the experiment has no value and must be repeated. Now, in Dr. Freire's inoculations the non-vaccinated persons serve as a control, and fortunately we have a sufficiently large number of these to enable us to form an estimate of the protective value of the inoculations practiced. For example, a death having occurred at No. 205 Rua Riachuelo, Dr. Freire finds among the residents of this cortiço five persons who consent to be vaccinated. There remain in the tenements of the cortiço from fifty to two hundred and fifty* persons unvaccinated. No yellow-fever deaths occur during the remainder of the year either among the vaccinated or the unvaccinated.

I continue now the notes of my personal investigations.

No. 39, cortiço. The proprietor insisted that not more than ten were vaccinated, and says that all except three moved away soon after the vaccinations were practiced. One of the three remaining is said to be an old woman who has lived many years in Brazil, a Portuguese. The other two are Brazilians, born in Rio. None of them have had yellow fever, either before or since vaccination.

No. 43, cortiço. My informant says that the vaccinated were mostly children, and that none of them have had yellow fever, either before or since vaccination.

No. 119, cortiço. All of the vaccinated have moved away. Three are said to have been Italians, and the rest Brazilians. All left soon after vaccination except one Italian. He left in October last. Has not had yellow fever.

Rua de Comte d'Eu.

No. 87. House is vacant.

No. 85. New tenants, who know nothing of former occupants.

No. 93. New tenants, who know nothing of former occupants.

No. 91. House is vacant.

No. 103. New tenants, who know nothing of former occupants.

* I regret that I did not obtain exact information as to the number of tenants in each cortiço visited by me. This did not occur to me at the time. One of these cortiços, however, which I have since visited (No. 63 Rua do Catete) is said by its proprietor to contain over four hundred tenants.

No. 133. House is vacant.

No. 199. House is vacant.

No. 198, cortiço. Only one man to be found who was here when the vaccinations were made. No further information could be obtained.

In the general résumé Dr. Freire reports that he made three hundred vaccinations in this street, and that there were eight deaths among unvaccinated persons; but in his detailed account, just above, he gives the number of deaths as eleven. Of these seven occurred in houses in which no vaccinations were made and two in houses in which he vaccinated but a single person.

According to the report of the Baron Ibituruna there are twenty-three cortiços in this street, containing from twenty to forty quartos each. It will be seen from this that there must have been a large number of unvaccinated persons in this street who did not die from yellow fever and a considerable number of cortiços in which no deaths occurred. What special value, then, can be attached to the fact stated by Dr. Friere that a non-vaccinated person died during the year at No. 79, and one at 97, and that a considerable number of vaccinated persons lived in the vicinity at Nos. 87, 93, 85, and 91.

Rua de Visconde d'Itauna.

No. 87, cortiço. Most of those vaccinated have moved away. The proprietor's two children were vaccinated. No cases of yellow fever have occurred in the cortiços since the vaccinations were practiced.

Rua des Invalides.

No. 77. Those who were vaccinated have all moved away.

Nos. 105 and 107, cortiço. Floating population; no information obtained.

Rua de Lavardio.

No. 53. No one in house who was there in 1885.

No. 51. One man, Bernard, aged fifty-eight years; says he was vaccinated; that he had been in Brazil six years; is a Spaniard. *He had yellow fever before he was vaccinated.* He knows that an Italian and his wife and child were vaccinated. They moved away soon after. Did not have yellow fever up to the date of leaving. No other information.

No. 45. House vacated in 1886. Present occupant knows nothing of previous occupants.

Rua de S. Leopoldo.

No. 6, cortiço. Some Italians who were vaccinated have gone back to Italy. There has been but one case of yellow fever since the vaccinations were practiced.

No. 19, cortiço. Proprietor says about twenty were vaccinated. Two who were vaccinated had the fever afterward; both recovered. Those who were vaccinated have all moved away except the proprietor, his wife, and an old man. The proprietor had the fever before vaccination. His wife has lived in Rio fourteen years and has not had fever, either before or since vaccination. The old man has lived in Rio for twenty-eight or thirty years.

No. 17. Three children vaccinated, all born in Brazil. No fever since, either among these or among others in the cortiços.

No. 59, Cortiço. Five children said to have been vaccinated, all Brazilians. No cases among these or others in the cortiço.

We proceed now to analyze the published statistics of Dr. Freire's inoculations made in the year 1885-'86, and in order to do him full justice, I quote extensively from his report:

STATISTICS OF THE VACCINATIONS PRACTICED WITH THE ATTENUATED MICROBE
OF YELLOW FEVER FROM SEPTEMBER, 1885, TO SEPTEMBER, 1886.

PART FIRST.

MORTALITY FROM YELLOW FEVER IN RIO DE JANEIRO ACCORDING TO OFFICIAL
DOCUMENTS.

The mortality from yellow fever during the epidemic of 1886 was 1,397 persons; foreigners, 1,084; Brazilians, 313.

Nationality of foreigners.—Portuguese, 659; Italians, 202; Spaniards, 55; Germans, 30. The others are principally French, English, Swiss, and Hungarians.

Age of the deceased.—From a few months to ten years, 175; from eleven to twenty years, 274; from twenty-one to thirty, 545; from thirty-one to forty, 178; from forty-one to fifty, 109; from fifty-one to sixty, 31; above sixty, 11; age unknown, 51; total, 1,397.

Observations.—Eight per cent. of the deaths were children whose age varied from a few months to ten years. The greater proportion of deaths is included between one and thirty years. This is, then, the period which appears the most favorable for the development of yellow fever. Now, we will see that out of the number vaccinated, which we will give in the second part of our statistics, two thousand six hundred and twenty-four individuals are comprised in this period.

Another fact which must not be lost sight of is that a fourth part of the deaths from yellow fever are among the Brazilians. The same proportion is met with in previous epidemics, as has been shown in the work "*Le vaccin de la fièvre jaune, résultats statistiques*," published in 1886.

We repeat again that the Brazilians, even those born in Rio de Janeiro, only enjoy a relative immunity, which diminishes according as their place of residence is removed from the city of Rio.

Preventive vaccination is, then, necessary also, in order to confer upon them immunity from the disease. The people of the lower class have happily comprehended this, as is proven by the fact that they form the greater number of those vaccinated in 1886.

We are also convinced that the number of deaths (1,397) from yellow fever is far from the truth, and we may without exaggeration estimate the number of victims at three thousand. Every one knows that for motives of private convenience a great number of physicians disguise in the official bulletins of mortality the well-confirmed diagnosis of yellow fever under the names of bilious remittent fever, pernicious hemorrhagic fever, typhoid fever, abdominal typhus, etc., especially in the "*Maisons de Santé*," where the sanitary regulations prohibit the treatment of patients attacked with yellow fever. Every day this falsification of diagnosis presents itself, and this abuse, which is not a state secret, continues in view of everybody, notwithstanding the protests of the press. It is to be desired that the sanitary authorities may make all possible efforts for the suppression of this state of things, which constitutes an assured peril. In order to be certain of this fact, one has only to glance at the bulletins of mortality published daily during the epidemic.

The official statement of deaths is as follows: Rio, 887; Jurajuba, 433; Nietheroy, 77.

At Nietheroy (capital of the province, situated on the bay of Rio) the deaths are divided as follows:

Brazilians.....	44	Spaniards	3
Portuguese	21	Germans	1
Italians.....	7	Irish	1

Hospital of Jurajuba.—Brazilians, 16; foreigners, 417. At Nietheroy the number of Brazilians exceeds that of the foreigners, because the city is chosen by preference as a place of residence by the Brazilians, who have recently arrived in the province of Rio.

Age of the deceased at Nietheroy.—One year and under, 3; one to ten years, 14; eleven to twenty years, 10; twenty-one to thirty years, 27; thirty-one to forty years, 9; forty-one to fifty years, 9; fifty-one to sixty years, 2; sixty-one to seventy-five years, 3—total, 77.

Out of 313 Brazilians coming from the provinces, there are from Minas, 19; Sao Paulo, 12; Santa Catharina, 2; Rio Grande, 9; Parana, 1; Matto Grosso, 1; Sergipe, 2; Bahia, 1; Pernambuco, 1; Rio de Janeiro, 265.

Included in the preceding figures are eight vaccinated persons who have not obtained immunity—Brazilians, 3; foreigners, 5; as follows:

First, Brazilians.

1. Mariana Candida Pimental; fifty-six years; native of Minas Geras, residing at No. 3, Rue San Francisco Xavier.

2. Carlos, son of Joaquim Pereira Guimaraes; 3 years; residing at No. 16 Rue du Marquez d'Arantes.

3. José, son of José da Costa Vieira; two years, residing at No. 187 bis. Rue Visconde de Sapucahy.

Second, foreigners.

4. Paschoal Rufino, Italian; twenty-one years; residing at No. 8 Rue du Areal.

5. Henri Constance, French; thirty years; residing at No. 29 Rue Evaristo de Veiga.

6. Fernando Argenteiro, Italian; thirty-two years; residing at No. 79 Rue General Caldwell.

7. Antonio Saraiva, Portugese; thirty-three years; residing at No. 7 Rue San Clemente.

8. Maria Emilia Tosta, Portuguese; twenty-eight years; residing at No. 78 Rue de Mattoso.

Then out of 1,572 foreigners vaccinated, 5 deaths; mortality, 0.3 per 100. Out of 4,479 Brazilians vaccinated, 3 deaths; mortality, 0.06 per 100.

We include in these figures all the vaccinated during the two preceding years, who have been carefully observed during the epidemic season.

SECOND PART.

Preventive vaccinations.—The number of vaccinations practiced with the attenuated culture of the microbe of yellow fever from September 1885, to September 1886, was 3,473, as follows: Brazilians, 2,763; foreigners, 710.

We must insist upon the fact that among the 2,763 Brazilians, there are 489 children of foreigners, all quite young and who in reality may be attached to the 710 foreigners as presenting the same degree of receptivity. Besides, 222 came from different provinces of the interior and from the coast, and who, finding themselves in Rio during the epidemic season, were in the same conditions as foreigners as regards contracting yellow fever, as is shown by the facts observed. The number, then, of vaccinated persons for whom residence can not be invoked as a cause of immunity, should in reality be 1,421.

There remain 2,053 persons of Brazilian nationality whose age varies from some months to sixty years. In this group a great number, by their age, the condition of their dwellings in the quarters most visited by the scourge, are in the most favorable conditions for becoming its victims. Besides, it is evident that immunity is only relative among the adult Brazilians, as is proved by the first part of these statistics, which give in the mortality by yellow fever 253 Brazilians in the city of Rio, 16 in the hospital of Jurajuba, and 44 in the city of Niteroy. This makes the number of deaths 313.

The vaccinations have been made especially at the points where the disease has developed itself with the greatest intensity. The greater part of those vaccinated resided in the cortiços or estalagens (a kind of low one-story houses resting upon the soil) in which the hygienic conditions are deplorable. All the physicians agree in declaring that these houses constitute the best *foyer* for the production and especially for the propagation of yellow fever.

Nationality of the vaccinated.—Brazilians, 2,763; Portuguese, 492; Italians, 115; French, 13; Spaniards, 43; Paraguayans, 16; Russians, 1; Swiss, 3; Germans, 5; Mon evide, 3; Argentine Republic, 4; Chilian, 1; United States, 2; Belgian, 1; African, 11.

Descent of 489 individuals born of foreign parents, included in the Brazilian section.—Children of Portuguese, 435; of Italians, 24; of Spaniards, 17; of Germans, 8; of French, 3; of Paraguayans, 2.

Indication of the Provinces from which 222 individuals came who are included in the Brazilian section.—Province of Rio de Janeiro, 83; Sao-Paulo, 31; Bahia, 29; Minas-Geraes, 16; Pernambuco, 14; Rio Grande du Sud, 11; Maragnan, 7; Sergipe, 5; Santa-Catharina, 5; Ceara, 5; Espirito-Santo, 3; Piauby, 2; Matto-Grosso, 2; Alagoas, 1; Para, 1; divers other provinces, 4.

It is notorious that the fact of residing some leagues from the city of Rio de Janeiro constitutes for all these individuals a much greater susceptibility to yellow fever. A great number of cases have been thus verified during the last epidemic. We have had also to regret the death of Dr. Telles, residing at Jacarepagua, who contracted yellow fever during a very short stay which he made in Rio. Among the vaccinated Brazilians we include eighty individuals coming from the Province of Rio de Janeiro, that is to say, dwelling some leagues from the capital.

Age of the vaccinated persons.—From a few months to ten years, 1,491; from eleven years to twenty years, 606; from twenty-one to thirty years, 527; from thirty-one to forty years, 391; from forty-one to fifty years, 296; from fifty-one to sixty years, 133; above sixty years, 29.

This shows that there is no danger in practicing the inoculations upon children, even very young. Besides, we call attention to the fact, already referred to, that the greater proportion of the vaccinated are aged from a few months to thirty years; that is to say, at the age when the mortality from yellow fever attains its largest figure. (See the table of mortality in the first part.)

Time of residence of the foreigners in Rio (including in this class the individuals born in the Province).—A few days, 53; a few months, 124; from one year to one and one-half years, 77; two years, 82; three years, 93; four years, 61; five and six years, 115; more than six years, 327.

Many of these 327 had only seven to eight years of residence, including the young persons engaged in commerce and those pursuing their studies.

REMARKS.

Among the foreigners vaccinated are the crews of several foreign vessels, the captains of which came themselves to claim the benefit of inoculation. We will mention particularly Captain Vallé of the sailing-ship *La Breteche*, from the port of St. Nazaire, whose conduct was beyond all praise.

Let us add yet an important observation made at the marine hospital of Jurajuba, which is especially provided for the reception of yellow-fever patients. Three who had been previously vaccinated were sent by the sanitary authorities to this hospital, but the disease was very benign, and the three persons recovered in a few days, while four hundred and thirty-three *non-vaccinated* became the victims of the *microbe amaril* in the same hospital.

General résumé.

Vaccinations practiced in 1886	3, 473
Died vaccinated	7
Vaccinations practiced in 1885	3, 051
Died vaccinated	1
Total vaccinated	6, 528
Total deaths vaccinated	8

Mortality among the vaccinated 0.1 per 100.

Mortality of the non-vaccinated, from the official figures, due to yellow fever, 1,389 in 1886; 278 in 1885; total, 1667.

Thus, as may be judged from what precedes, the immunity conferred by the attenuated microbe, without being absolute, has nevertheless produced very satisfactory results.

Taking into consideration the epidemic centers, in the midst of which the vaccinated resided, we may estimate the number of individuals exposed to contract yellow fever at the maximum figure of 160,000. On comparing this figure with that of the vaccinated and the number of deaths among the vaccinated with the number of deaths among the non-vaccinated we calculate that the mortality is 1 per 1,000 for the vaccinated, and 1 per 100 for the non-vaccinated.

We have quoted extensively from this last report of Dr. Freire in order to do him full justice by allowing him to state his own case. We shall now proceed to show that his statistics are fallacious, and that the percentage of mortality among the vaccinated, which he finds to be ten times less than among the non-vaccinated, results from a misuse of the statistical method and from a number of factors, which are favorable to Dr. Freire's statistics as he has stated them, but not to a fair test of his method of prophylaxis.

In the first place, we would call attention to the fact that while during the comparatively healthy year, 1885, the immunity among the vaccinated of that year is said to be complete (see report of 1885), the number of deaths during the epidemic year which followed is stated by Dr. Freire himself to have been eight. Taking all of the vaccinated of the two years, and without making any allowance for the considerable number of persons vaccinated who had, no doubt, left the city before the epidemic of 1886 occurred, Dr. Freire with a total of 6,524 vaccinated, and a total of 8 deaths, makes the proportion 1 per 1,000. This is equivalent at the outset to an addition of 1,476 persons to the number vaccinated, who being imaginary persons and not having been exposed to the epidemic influence simply aid in rounding up the general percentage of mortality in Dr. Freire's favor to the even figure of 1 per 1,000. This is but one of many factors which go to make up this favorable showing. Refer-

ence to Dr. Freire's manuscript journals, which he kindly placed in my hands, shows that of the total number vaccinated during the two years, 4,465 were vaccinated prior to the epidemic of 1886, that is to say, before the 1st of January, 1886. How many of these left the city before the outbreak of the epidemic, how many were only temporarily in the city when vaccinated, how many died from other diseases, I can not say; but it is a significant fact that of the 3,051 vaccinated prior to August, 1885, Dr. Freire has only 1 fatal case to report, while out of 460 persons vaccinated in January and February, 1886, he reports 5 deaths, a mortality of more than 1 per cent., which he gives as the general mortality among the non-vaccinated. This is not apparent from Dr. Freire's own statement of the case, but is nevertheless true, as I shall proceed to show. In his report, which we have just given in full, he does not give the date of the vaccination of these individuals, but upon referring to his manuscript journal for 1886, I find that No. 3 of his list, José, son of José da Costa Vieira, was vaccinated February 12, 1886; No. 4, Paschoal Rufino, on the 6th of February, 1886; No. 5, Henri Constance, on the 1st of January, 1886; No. 6, Fernando Argenteiro, on the 20th of February, 1886; and No. 7, Antonio Saraiva, on the 12th of February, 1886. The same manuscript record for 1886 shows that during these two months—January and February, 1886—the total number vaccinated by Dr. Freire was 460. That is to say, the mortality among those vaccinated during these two months was more than 1 per cent. On referring to the mortality lists of the city for the same two months, I find the total number of deaths to have been 369, which in a total susceptible population of 160,000 (Dr. Freire's estimate), would give a mortality of one in 436.

In a communication made to the French Academy of Sciences on the 4th of April, 1887, and published in the "Comptes rendus" of that date, Dr. Freire says: "In this number of 1,675 deaths there are included 8 vaccinated persons and 1,667 not vaccinated. Before going any further we ought to remark that the vaccinated who died during the epidemic were inoculated at the moment when the method of inoculation was yet imperfect." Upon reading this sentence the natural inference is that these individuals had been inoculated by Dr. Freire at the outset of his attempts in this direction. To my surprise, I found upon referring to his record that five out of the eight had been vaccinated in January and February, 1887, and that consequently the sentence quoted, which has all the authority of a well-considered communication made to the French Academy of Sciences, involves the admission that the 4,465 persons vaccinated prior to this time had been vaccinated by an imperfect method.

Again I find that in 1886 as in 1885 Dr. Freire has included in his statistics a large number of persons who were vaccinated after the termination of the epidemic, and whose exposure was but little greater than that of the 1,476 imaginary persons who must be added to his list in order to give the mortality of 1 per 1,000.

Dr. Freire has not given us the date of his vaccinations in his elaborate presentation of his statistical results, but I find from his manuscript record that they were distributed throughout the year as follows—I place in a parallel column the figures showing the total mortality from yellow fever during the period:

Month.	Vaccinations.	Total deaths from yellow fever.
1886.		
January	84	135
February	376	234
March	253	347
April	167	220
May	945	48
June	21	18
July	57	9
August	3	2

This table shows that during the epidemic period from January 1 to April 30 there were 880 vaccinations, and during the same period 936 deaths occurred from yellow

fever, while during the months of May, June, July, and August, when the total mortality was but 77, the number of vaccinations was 1,026; *i. e.*, a majority of the vaccinations was practiced after the epidemic season was over, and upon persons who, no doubt, had for the most part passed through the epidemic season without contracting the disease.

We turn now to the age of the vaccinated persons. Dr. Freire says, in his report first quoted: "The greater proportion of the deaths is comprised between one and thirty years. This is, then, the period most favorable for the development of yellow fever. Now, it will be seen that among the number vaccinated, which we give in the second part of our statistics, 2,624 individuals are comprised in this period." But Dr. Freire has elsewhere shown us that the age which gives the greatest mortality is from twenty-one to thirty years. Let us then see what proportion of the vaccinated are included in these limits. Reference to his tables shows the deaths between twenty-one and thirty years of age to have constituted 39 per cent. of the entire mortality, while only 15 per cent. of the vaccinated fell within these limits of age. On the other hand 43 per cent. of the vaccinated were less than ten years of age, while the mortality for this period was only 12.5 per cent. of the entire mortality. We note also that a large number of the children vaccinated were infants below two years of age.

Let us turn now to the table given by Dr. Freire on page 11 of the report under consideration:

Time of residence of the foreigners in Rio (including in this class the individuals born in the provinces).—A few days, 53; a few months, 124; one year to a year and a half, 77; two years, 82; three years, 93; four years, 61; five and six years, 115; more than six years, 327.

We remark, first, that it is not apparent from Dr. Freire's figures how many of these foreigners were vaccinated after the termination of the epidemic, or how many of the fifty-three who had been in the city but a few days were travelers who did not remain many days after their vaccination, and who kept away from infected localities while in the city. No doubt the crews of certain foreign vessels, to which Dr. Freire refers on page 15, are included in this number. We have no data as to the period of the year when these vaccinations were practiced, or as to the exposure of the vaccinated persons after they were vaccinated.

As an illustration of the insufficient nature of the evidence in the case of persons temporarily in the city, I will cite the case of an American physician, engaged in missionary work at San Paulo. This gentleman published an account of his case in one of our medical journals which gave me the impression that after being vaccinated by Dr. Freire he had passed through an epidemic of yellow fever in Rio. I learn, however, from the best authority, that he only remained in Rio a few days after he was vaccinated, and that instead of being exposed in the infected parts of the city, he spent his nights, at least, at Petropolis, which is the harbor of safety for foreigners, up to the date of his sailing for the United States. Moreover, this gentleman had formerly resided in the city of Rio for several years. His escape from an attack under these circumstances can scarcely be attributed to the vaccination practiced by Dr. Freire. As a matter of fact numerous unvaccinated foreigners passed through the entire epidemic season of 1886 without contracting yellow fever. This is true, for example, of our consul-general at Rio, and of the vice-consul, who both came from the United States in 1835; who went to their office in the heart of the city every day throughout the epidemic season, and who did not spend their nights at Petropolis, but remained within the city limits.

My inquiries have developed the fact, also, that a large number of Americans, Englishmen, and Germans engaged in business in Rio have had a similar experience. Many of these gentlemen have passed through several successive epidemics without suffering an attack. This is shown by the table which we have quoted above from Dr. Freire's report. Out of a total number of nine hundred and thirty-two foreigners and natives born in the provinces vaccinated in 1886, six hundred and

seventy-eight, or 71.6 per cent., had resided in the city more than two years, and four hundred and forty-two, or 47.4 per cent., for five years and above. That is to say, over 70 per cent. of the whole number had already passed through one or more epidemics of yellow fever without contracting the disease prior to the time when they were vaccinated by Dr. Freire, unless he vaccinated persons who had previously suffered an attack, in which case the experiment would evidently be without value. Among the vaccinated foreigners are a large number who had resided in Rio for ten years and above, and some even as long as twenty-five years.

By referring to the mortality lists of the Jurajuba hospital for 1886 and 1887, I find that out of 194 cases in which the time of residence in Brazil is given 117 had been in the country for one year and below, 36 from one to two years, and 41 for three years and above. In other words, more than 78 per cent. of the fatal cases were among foreigners who had been less than three years in the country, while only 36 per cent. of the foreigners vaccinated by Dr. Freire had been less than three years in the country.

The total number vaccinated in 1886 is given by Dr. Freire as 3,473, of whom 2,763 were native Brazilians and 710 foreigners. That is, the foreigners constituted about one-fifth of the total number vaccinated. But the total number vaccinated during the epidemic season from December 1, 1885, to April 30, 1886, was only 922. If the foreigners have the same ratio to this fractional part of the vaccinated as to the whole number we would have as vaccinated during the epidemic season 185 foreigners, over two-thirds of which number had resided in the city at the time of the previous epidemic (1884).

Let us now turn to Dr. Freire's tabular statement of the streets and houses in which vaccinations were practiced. This appears at first glance to be a strong statement of his case, but this appearance is illusory and depends upon the omission of an important element, viz, an account of the number of unvaccinated persons who were placed in the same conditions as the vaccinated and who did not contract yellow fever. I have called attention to this point in my review of Dr. Freire's statistics for the year 1885, and it is unnecessary to repeat in detail the statements made there. Let us make, however, an analysis of a different kind. We find by reference to page 12 of his published report for the year 1886 that the whole number vaccinated in the streets mentioned on this page was $810=23.3$ per cent. of the whole number vaccinated. The number of deaths in the same streets was $110=7.8$ per cent. of the total mortality. On the other hand, we find by reference to page 13 that the mortality in "different streets in the center of the city" was $134=9.6$ per cent. of the entire mortality, while the number vaccinated in this part of the city was only $65=1.8$ per cent. of the total number vaccinated. Again we find that nearly 12 per cent. of the vaccinated resided in Nictheroy, a city which has a population of over 20,000, not counted in the general estimate of 400,000, which is accepted as the population of the city of Rio in the statistics of the central board of health. The number of deaths in Nictheroy was, however, less than 6 per cent. of the total number of deaths.

Finally, as to the nationality of the vaccinated, 2,763 are said to be Brazilians and 710 foreigners. Dr. Freire insists on including with the foreigners 222 Brazilians who came from the provinces, and states in detail the various provinces from which they came. The inference is therefore justified that, with this exception, the Brazilians vaccinated are natives of the city of Rio. That is to say, 2,541 of the vaccinated persons were born in the city of Rio. This number includes natives of all colors and all shades of color. The proportion of natives born in the city is, then, about 72 per cent., and that of foreigners and natives born outside of the city about 28 per cent. Now, this is probably a larger proportion of natives born in the city than would be found in a correct estimate of the entire population. The population of foreign birth is estimated at 100,000. The number of deaths from yellow fever among the foreign population in 1886 is given by Dr. Freire as 1,084, which gives a proportion of 1 to 92.2.

Dr. Freire, including all of the foreigners vaccinated in 1885 and 1886, without allowing for those vaccinated after the termination of the epidemic, or those who had left the city before it commenced, or those who ran away during its prevalence, admits a mortality of 5 out of 1,572 foreigners vaccinated, which gives a ratio of 1 to 314. In the same way, admitting three deaths among the total number of 4,949 Brazilians vaccinated in the two years, he finds the mortality to be 0.06 per 100 = 1 to 1,666. The entire mortality among the native population in 1886 was 313, which in a population of 300,000 gives a ratio of 1 to 958. When we consider the several points heretofore referred to, it will be seen that these figures can not be accepted as establishing Dr. Freire's claim to have discovered a method of preventing yellow fever by inoculations with his "attenuated microbe," even when we take his own statement of the number of deaths. But, as I shall show later, there is good reason to believe that Dr. Freire's list of eight vaccinated persons who succumbed during the epidemic of 1886 is by no means complete.

In the first place, with the best possible will to discover all of the fatal cases, it would be hardly possible to do so. My own investigations, heretofore detailed, show that the population of the cortiços, in which Dr. Freire's vaccinations have for the most part been made, is a floating population, and that after the lapse of a little time it is often impossible to obtain any information with reference to the vaccinated persons. The identification by residence can, therefore, not be depended upon when a name in the official mortality lists corresponds with that of a vaccinated person.

For example, Dr. Freire vaccinated July 6, 1885, a woman named Ludovina de Jesus, a Portuguese, aged forty-three years, living at 45 Rua S. Luzia. On the 15th or February, 1886, according to the official mortality lists on file at the office of the central board of health, a woman of the same name and nationality, aged forty-six years, died at Rua de Senador Verguero, No. 12.

In company with Dr. Cleary I visited both of these addresses. The occupant of the house where Ludovina de Jesus died says that she was a washerwoman who had only been in his house a few days at the time of her death. He knows nothing of her former history. At No. 45 Rua S. Luzia, where, according to Dr. Freire's manuscript journal, a Ludovina de Jesus was vaccinated, I could obtain no information. The number given is that of a cortiço containing numerous apartments. The proprietor says there is no one in his rooms who occupied them in 1885, and he knows nothing of the person named.

Again Dr. Freire's books show that *Maria dos Anjos*, aged seven years, Portuguese, was vaccinated March 24, 1885, at Rua de V. d'Itauna, No. 165.

The mortality lists show that a child of the same age and nationality, named *Maria dos Anjos e Silva*, died January 28, 1886, at No. 372 Rua d'Alfendega. This address was visited and I was informed by the present occupant that the father of the child had returned to Portugal. No further information could be obtained. Upon visiting the house where the vaccination was practiced I could obtain no information. The place is a cortiço; the proprietor and his tenants are all new people and know nothing of the former occupants of the place.

Again, *José de Oliveira Coelho*, a Portuguese, aged forty-two years, appears in the official record as having died at Rua de Carvalho de Sá, No. 4, on the 15th February, 1886.

Dr. Freire's books show that *José de Olivera*, a Portuguese, aged forty-two years, was vaccinated June 5, 1885, at No. 10 Rua da Alfendega. Upon visiting the latter address the house was found to be empty and undergoing repairs. The proprietor of the cortiço where the death is reported to have occurred denies that a person of this named died in his apartments in 1886. No further information could be obtained. I did not find time while in Rio to make any further efforts to identify individuals by visiting the address given in the mortality lists, and in those kept by Dr. Freire, in cases where the name, age, and nationality corresponded nearly enough to suggest identity. But in a partial comparison of these lists I found three cases in which the probability of identity seems to be very great. In each case the individuals were

vaccinated in 1885 and in each case the age given in the mortality lists of the following year is, as it should be, one year more than that of the individual vaccinated. The names are as follows:

1. *Antonio Borges*; ten years of age; Portuguese; vaccinated in 1885 (No. 1882); residence, Rua S. Christovão No. 66. *Antonio Borges Godinho*; eleven years of age; died March 14, 1886; residence, Rua S. Christovão No. 77.

2. *Antonio Gomes da Silva*; sixteen years of age; Portuguese; vaccinated in 1885 (No. 31*); residence, Rua Senador Euzébio No. 64; one year in Brazil. *Antonio Gomes da Silva*; seventeen years of age; Portuguese; died May 21, 1886; residence, Rua do Barão de Itapigipe No. 30.

3. *Rosa Maria Bastos*; nine years of age; Portuguese; vaccinated in 1885 (No. 1898); residence, Rua Miguel de Frias No. 30. *Rosa*; ten years of age; Brazilian; residence, Rua Miguel de Frias No. 30; died February 12, 1886.

I can scarcely doubt that these three cases and that of Ludovina de Jesus should be added to the list given by Dr. Freire of persons vaccinated in 1885 who died in 1886. The cases of *Maria dos Anjos* and *José de Oliveira* may be considered cases of probable identity. To these I may add the following:

1. *Manuel Alves Pinto*; twenty-seven years of age; vaccinated in 1885 (No. 347); residence, rua da Sant' Anna, No. 76. *Mannuel Alves*; twenty-eight years of age; Portuguese; died in the Jurajuba hospital in 1886.

2. *José da Costa*; twenty-six years of age; Portuguese; vaccinated in 1885 (No. 3); residence, rua Miguel de Frias, No. 40. *José Ignacio da Costa*; aged twenty-six years; Portuguese; died April 15, 1886; residence, rua Estacio de Sá, No. 40.

3. *Leonor*; four years of age; Brazilian; vaccinated in 1885 (No. 736); residence, rua Conde d' Eu, No. 137. *Leonor*; five years of age; Brazilian; died March 2, 1886; residence, rua do Evaristo da Veiga, No. 65.

4. *Maria Augusta*; sixteen years of age; Portuguese; vaccinated in 1885 (No. 2729); residence, Senador Pompeo, No. 4 A. *Maria Augusta Pacheco*; aged sixteen years; Portuguese; died March 15, 1886; residence, rua dos Invalidos, No. 99.

5. *Emelia*; four years of age; Brazilian; vaccinated in 1885 (No. 1507); residence, rua General Caldwell, No. 105. *Emelia*; five years of age; Brazilian; died March 5, 1886; residence, rua de S. José, No. 68.

6. *Elvira*; three years of age; Brazilian; vaccinated in 1885 (No. 81); residence, rua General Caldwell, No. 114. *Elvira*; four years of age; Brazilian; died February 20, 1886; residence, rua do Lavradio, No. 170.

Another *Elvira*; aged three years; Brazilian; died March 4, 1886; residence, rua do Senador Pompeo, No. 149.

A complete research would no doubt add considerably to this list, and a visit to the addresses given above might in some cases show that the correspondence in name and age was simply a coincidence, and that the vaccinated person is still living. In other cases, judging from my efforts in this direction already reported, it is probable that no information would be obtained and the question of identity would still remain in doubt. Since my return from Brazil I have received a letter, dated January 14, 1888, from Dr. Cleary, an American physician practicing in Rio, in which he says:

"I have discovered another case for you. A French-American named Bitté, employed by Robin in the rua d' Assembleia, and living at the Hotel Commercine, was inoculated by Dr. Freire in 1885, and some weeks after died of yellow fever. This I tell you on the authority of the book-keeper, and I am quite sure of its truth."

In Dr. Freire's report under review, he says, on page 7: "We include in these figures all the vaccinated during the two previous years *who have been carefully observed during the epidemic season.*"

That portion of the sentence which I have italicised surprises me exceedingly. From what has been said it will be seen that a careful observation of the floating

* The number is that given in the list published in the Jornal de Noticias.

population of the cortiços in which most of the vaccinated persons resided would be practically impossible, even with a large force of inspectors at command.

Dr. Freire himself did not find time to make the vaccinations among these poor people of the cortiços, but delegated this work to certain apothecaries. One of these, Mr. Telles, informed me that he had himself vaccinated between three and four thousand persons. He also communicated the startling information that none of those inoculated with the "attenuated microbe" of yellow fever had contracted small-pox during the recent epidemic in Rio, leaving me to infer that the vaccine was a protection against both diseases. This intelligent (?) apothecary, a mulatto, recorded a large portion of the statistics which Dr. Freire has tabulated, and we are certainly at liberty to question whether his record is complete and accurate in all particulars. For example, it would be quite natural, and perhaps excusable to write *Maria dos Anjos* instead of *Maria dos Anjos e Silva*. As a matter of fact, a large number of the vaccinated persons are designated by a single name, *e. g.*, Antonio, José, Maria; or by two baptismal names which do not include the family name, as, *e. g.*, Maria José, etc. Under these circumstances, and in view of the fact that many of the vaccinated did not remain in the city, we can not allow Dr. Freire's assertion that all the vaccinated "have been carefully observed during the epidemic season" to pass unchallenged.

Our analysis leads us to the conclusion that *there is no satisfactory evidence that Dr. Freire's inoculations have had any prophylactic value.*

THE YELLOW FEVER "GERM" OF DR. CARMONA Y VALLE, OF MEXICO.

Dr. Manuel Carmona y Valle has given an account of his researches and supposed discovery in his memoir, entitled: "*Leçons sur l'étiologie et la prophylaxie de la fièvre jaune*," Mexico, 1885.

I am indebted to Dr. Carmona for a copy of this work, which he presented to me at the time of my visit to Mexico. The following inscription, signed by him, is upon the title-page and is a frank acknowledgment that the author has modified his views very considerably with reference to his earlier observations:

A M. LE DR. STERNBERG:

Quoiqu'il soit nécessaire de modifier toute la partie relative à la morphologie et aux cultures du micro-organisme.

DR. CARMONA Y VALLE.

MEXICO, le 26 septembre 1887.

In view of this acknowledgement I do not consider it necessary to review at length the work of Dr. Carmona, but will quote the résumé which he has given in his "*Septième Leçon*" in order to show the morphology of his *Penerospora lutea* as he conceived it at the time this work was written.

Admitting but two phases in the development of the fungus which produces yellow fever, I shall recapitulate the succession of the phenomena which occur, in order to fix them well in your memory.

Let us take as point of departure the urine eliminated by yellow-fever patients. It contains, as you know, a great number of zoospores, or very small granulations, endowed with motion—*douées d'un mouvement propre*—and which only measure a thousandth of a millimeter in diameter. These granules are united in pairs, and little by little they unite into a single one, which grows gradually. This becomes opaque, and assumes a gamboge-yellow color by reflected light, and yellowish-red as seen by refraction.

Some of these spores, the dimensions of which are very variable, attain sometimes twenty-four thousandths of a millimeter in diameter. They hibernate in many cases for a longer or shorter time, and on other occasions they germinate at once and

produce the *mucédine* which we have described. The spores of this *mucédine* in penetrating into the animal economy give birth to a *peronospora*, in the organic dilations of which appear a great number of zoosporangia filled with zoospores. When the little zoosporangial pouches are ruptured, the zoospores are distributed throughout the economy, and are nourished at the expense of the elements which they encounter in the cells of all the organs. In the kidneys they destroy the epithelium of the tubules, and by reason of their number obstruct the interior of the uriniferous canals, and determine thus a diminution of the quantity of urine and difficulty in the elimination of the urea. From the accumulation of this principle in the blood comes the acute uremia, accompanied by all its symptoms. In addition, the nerve cells, the muscular fibers of the heart, the blood globules, and the hepatic cells, injured in their turn by the great number of parasites which are nourished at their expense, determine the pathological complexus known under the name of yellow fever. When later, after their union, the zoospores form the yellow spores, these give to the patient or to the corpse the typical color which we know. These same zoospores which exist in the urine, in the vomited matters, and in the feces form the seed which later will reproduce the *mucédine*, and with it the same circle which we have already described. It is unnecessary to tell you that the corpse is a veritable nursery of zoospores, and for that reason a focus of germs capable of reproducing the disease.

The discovery of the *mucédine*, which at first presented some difficulties because of the manner in which I regard the germ of yellow fever, came later to explain to me certain phenomena which had seemed to me up to that time to be difficult of comprehension.

I wish to speak of the mode of transmission of yellow fever. You know that it can not be considered as contagious in the full acceptation of the word, or, in other terms, that it does not appear to be transmitted from individual to individual, as occurs in typhus and other maladies which are directly transmissible, or contagious. We see yellow fever attack indifferently persons who are in direct contact with the sick, or others who, holding themselves removed, live in the same locality. Besides, a patient attacked with yellow fever never transmits the disease to persons who do not live in conditions suitable for the development of the germ. Persons attacked with yellow fever often come from Vera Cruz to Mexico, and we have never seen them communicate the disease to those who surround them, as could not fail to happen if the disease could be transmitted directly from individual to individual.

The discovery of the *mucédine*, a variety intermediary between the primitive spore and the *peronospora* which produces the malady, furnishes a means of explaining this mystery. The zoospore, or the spore given off by the patient, can not directly give yellow fever, because it does not immediately produce the *peronospora lutea*; and it is for this reason that the sick person can not communicate immediately the disease with which he is attacked. This is why the appearance of yellow fever is impossible in the localities where the tellurico-atmospheric conditions do not permit the development of the *mucédine*.

At the time of my visit to Mexico Dr. Carmona had abandoned the idea of a genetic relation between the so-called zoospores, found by him in the urine of yellow-fever patients and the hyphomycetous fungi above referred to under the name of *peronosporée* and *mucédinée*. He, however, adhered to the belief that the "zoospores" were directly concerned in the etiology of yellow fever, and believed that he had demonstrated by recent observations that these "zoospores" develop into a bacillus.

According to Dr. Carmona's present idea the zoospores develop into bacilli, and these again break up into zoospores. This he believed to have proved by culture-experiments in which he obtained from the urine first a culture containing the zoospores, while later, on making a second culture from this stock, he found upon microscopic examination only bacilli. He was kind enough to show me a stained preparation of the zoospores and of the bacilli. I recognized at once in the former a micrococcus which does not differ in its morphology from one found constantly in urine which has undergone alkaline fermentation—the *M. ureæ* of Cohn. Evidently Dr. Carmona's inference that this micrococcus and the bacillus which developed in his cultures from the same source represent different stages in the life-history of a single organism is a mistake. I have proved this by isolating the two organisms from a culture which he gave me at the time of my visit to his laboratory. Moreover, this culture contained numerous other organisms, including one or more species of hyphomycetous fungi.

Bacteriologists know very well that it often happens when a culture-medium is in-

oculated with impure stock that one organism—and very commonly a micrococcus—takes the precedence, and that upon microscopical examination, this, by reason of its abundance, may appear to be the only organism present, but that later other organisms present may develop in their turn, while the first disappears or is found in comparatively small numbers. It is in this way that we explain the alternation of micrococci and bacilli obtained by Dr. Carmona in his cultures. A few spores of the bacillus present in the first instance might easily escape notice.

All bacteriologists will agree that the finding of micro-organisms in the urine, when they have not been demonstrated to be present in the blood and tissues, can have but little significance in the absence of an exact demonstration of their specific pathogenic power. We now know that a variety of micro-organisms are constantly present upon the surface of the mucous membrane at the extremity of the urethra, and that however carefully the sound and the receiving vessel may be sterilized, it is practically impossible to obtain urine from the bladder free from these micro-organisms without first sterilizing the urethral canal. The writer recently passed a little urine into a sterilized test-tube, the cotton stopper of which was removed for an instant and immediately replaced. The test-tube was placed in a culture-oven for 48 hours, at a temperature of 98° F., and at the end of this time a drop of the contained urine, which gave the usual evidence of having "broken down," was used to inoculate a series of Esmarch tubes. From these no less than seven distinct micro-organisms were obtained.

A more complete analysis of the micro-organisms commonly found in the urethra and in urine from healthy individuals is that made by Lustgarten & Mannaberg*.

The authors examined the extremity of the normal human urethra. After cleaning the glans with a piece of cotton wet with a solution of carbolic acid, they introduced a little spoon of platinum, sterilized by heat, into the *fossa navicularis*, and the traces of mucus secretion adhering to this were conveyed to a culture-medium and the micro-organisms present isolated by Koch's plate method. Ten different micro-organisms were recognized by microscopic examination which were found in greater or less abundance in eight cases carefully studied. They found almost constantly bacilli which in all respects resemble the "smegma-bacillus," but which they did not succeed in cultivating. In the second place they describe a diplococcus which was met with in perfectly healthy individuals and which in form and dimensions exactly resembles the "gonococcus" of Neisser. The *Staphylococcus pyogenus aureus* and *Diplococcus subflavus* of Bumm & Flügge were present, together with a number of species not previously described. One named *Streptococcus giganteus urethrae* consisted of long chains of round elements, which just before division showed a transverse line, and after division presented the appearance of oval diplococci. The bacteriological examination of the urine showed that whenever this was permitted to pass through the urethra it contained a variety of micro-organisms, which, however, were for the most part not able to develop in normal urine, which is an acid fluid, and therefore not suited to serve as a culture-medium for very many species of bacteria. The observations of the authors named convinced them, however, that normal urine as it exists in the bladder is free from micro-organisms.

It is evident, from what has been said, that we have no guaranty that micro-organisms found in the urine of yellow-fever patients or in cultures made from such urine are from the interior of the bladder, unless the urine has been collected by a method which excludes the possibility of contamination by these various micro-organisms lying upon the surface of the mucous-membrane at the extremity of the urethral canal. I do not find any satisfactory evidence that the required precautions were taken by Dr. Carmona, or by those who collected urine for him in Vera Cruz and elsewhere.

* Ueber die Mikroorganismen der normalen männlichen Urethra und des normalen Harnes. *Vierteiljahrsschrift für Dermatologie und Syphilis*, 1887, No. 4.

The writer fully appreciated this difficulty, when in Havana, in 1879, and therefore did not attach any special significance to the presence of various micro-organisms observed in yellow-fever urine collected in sterilized vessels. Such urine examined immediately after collection was not found to contain any bacteria, but after it had been standing in the laboratory for a short time there was an abundant development of various forms. My photographs show a bacillus in pairs, with rounded ends; a bacillus with square ends in long chains; budding torula-cells; spherical organisms, etc. Now as albuminous urine is a suitable culture-medium for a variety of micro-organisms, and as the urine examined by myself in Havana and by Dr. Carmona in Mexico came from infected localities, it is quite possible that one or the other of the micro-organisms which we have encountered in this fluid is the genuine yellow-fever germ; but, if so, there is no evidence or record which goes to prove that such is the case.*

DR. CARMONA'S ZOOSPORES.

Dr. Carmona has given a remarkable account of the resisting power of his zoospores to heat and chemical agents. He says on page 199 *et seq.*:

I have already said to you that notwithstanding the resemblance of these microbes with certain bacteria of putrefaction, they differ from these by their aerobic property. * * * But they can likewise live outside of the influence of the air, and in order to prove it to you it will suffice to recall to you that I have encountered millions, gifted with their peculiar movements, in a preparation of the liver preserved for three years in Canada balsam perfectly dry. Consider that these organisms, inclosed between two plates of glass, and in Canada balsam, were perfectly protected from contact with the air, as is every preparation preserved in balsam. Then, if after remaining three years in this condition they preserve their proper motion, it is clear that their organization may be preserved without the presence of oxygen.

You can form a general idea of the resistance of our zoospores in recalling the different liquids which acted upon the preparation before it was completely finished. The liver was macerated for a month in Müller's fluid, and as at the end of this time it was not found sufficiently hardened, it was put for eight days in a solution of chromic acid. Then thin sections were made with a microtome which were passed through the picocarmine of ammonia to stain them. After that the sections were put into absolute alcohol to dehydrate them, then into turpentine to make them transparent, and finally they were fixed in Canada balsam dissolved in chloroform.

On another page (60), Dr. Carmona explains that in the experiment above referred to he first removed the cover-glass from the preparation, then detached the section of liver and macerated it for some minutes in distilled water, after which he says:

I placed it then upon a slide and examined it under the microscope to see the yellowish conglomerates inclosed in the hepatic capillaries. I saw the granular matter entirely compact and did not remark any movement in the granules. I then took a simple microscope and endeavored to disaggregate the granular conglomerate by means of a needle, then adding a drop of water I again examined it with a suitable power (400 diameters). I noted then that the detached granules resumed their oscillatory movements as if they had never been inclosed in the Canada balsam. These experiments were made in presence of Dr. Miguel Alvarado and of Mr. Pablo Bergés. Gentlemen, this experiment is decisive, because it demonstrates to us not only that the yellowish conglomerates which we saw in the capillaries of the portal vein are formed by the same mobile granules which one meets in the urine and in the blood of yellow-fever patients, but because it proves also the enormous resistance of these organisms which preserve all of their vitality after having remained more than three years in Canada balsam.

It is evident that Dr. Carmona, in the above account, has made two errors of inference: First, in supposing the masses of granular material in the hepatic capillaries—probably blood corpuscles changed by the fluids in which the tissue had been hardened—to be identical with the so-called zoospores in the urine. Second, in supposing that the molecular movements observed—brownian—were evidence of vital

* Since this report was written I have had an opportunity to make cultures from urine obtained, *post-mortem*, through the walls of the bladder, in a considerable number of typical cases of yellow fever, and have found that as a rule it is sterile.

activity. The latter mistake has also led him into error with reference to the resisting power of these "zoospores" to heat and to germicide agents. Thus, on page 157, he says:

The results of these last experiments are as follows: First, temperatures of 100° to 120°, which are commonly recommended for the destruction of the micro-organism of yellow fever, are totally insufficient. In order that the action of the temperature may be effective, it is necessary to raise it to 160° and maintain it for two or three hours consecutively.

The account given of the experiments referred to shows that 160° centigrade is the temperature meant, which is 60° above the boiling-point of water, or 320° Fah.

In like manner it was found that remaining for twenty-four hours in a 1 per cent. solution of bichloride of mercury did not destroy the zoospores.

Dr. Carmona has also reported his failure to stain these zoospores with the aniline colors. He says:

At the commencement of my studies I tried to color the zoospore of yellow fever, and up to the present time I have not succeeded. Tincture of iodine produces no change upon these organisms, and if the iodine solution is aqueous the zoospores preserve all their movements in it as I have already said. * * * I have not succeeded any better in coloring these organisms with the aniline colors. I should say that I have employed by preference methyl-violet B. I have submitted the zoospores to the action of this coloring matter during a shorter or longer time (from one hour to thirty-six hours) and I have never been able to color them. The zoospores retained their proper movements in these solutions and preserved their normal color. I have employed the solutions cold and at temperatures more or less elevated, in some cases boiling, and the results have always been negative.

The above account of the characters of the so-called zoospores makes it apparent that Dr. Carmona has constantly mistaken the well-known molecular or brownian movement of minute particles suspended in a fluid for vital movements, and has taken this as evidence that he had under observation living microorganisms. For us the characters given seem almost to demonstrate that the particles in question were inorganic; at least they were not micrococci, such as Dr. Carmona showed me in a mounted preparation in his laboratory, said to be from a culture obtained from the urine of a yellow fever patient, for these "zoospores" were well stained and were undoubted spherical organisms—micrococci, which in their morphology resembled those constantly found in urine which has undergone alkaline fermentation.

EXPERIMENTS UPON ANIMALS.

Dr. Carmona says on page 137 of his *Mémoire*:

I will speak to you later of the inoculations which I have practiced, and which I consider capable of preserving from the *vomito negro*. To-day I will confine myself to telling you that before deciding to inoculate man I made a great number of experiments upon animals. I introduced into them the zoospores by different channels. I caused it to penetrate directly in the torrent of the circulation; I deposited it in the cellular tissue; I introduced it into the respiratory passages, and into the alimentary canal, and finally I injected it into the renal parenchyma, and never, no never have I succeeded in obtaining the symptoms of yellow fever.

It appeared to me strange that the zoospore being the generative principle of yellow fever, the malady was never reproduced in the great number of experiments which I have made. To-day the explanation is very simple, since we know that neither the zoospore nor the spores which come from it develop directly in the economy the *peronospora lutea* which determines the *vomito noir*. It is necessary first that the spores germinate and give birth to the *mucédinée*, an intermediary species, in order that these spores may develop in the animal economy the tablean of symptoms called yellow fever by the development of the *peronospora lutea*.

Although Dr. Carmona has abandoned his *peronospora lutea*, his experiments with the so-called zoospores remain as evidence of the innocuousness of the micro-organisms present in the material used in his experiments, so far as the animals experimented upon are concerned—species not named. His results are in accord with those heretofore reported from other sources.

METHOD OF INOCULATION.

Dr. Carmona gives the following account of his method of inoculation:

The method of performing the inoculation is very simple. In the first place, the urine of the sick is collected, taking care not to take that of patients suffering from any visceral affection, still less from gonorrhea or syphilis. It is well to employ the urine secreted when the disease is well established, because it contains a greater quantity of zoospores. This urine is placed in large shallow plates, and abandoned to spontaneous evaporation, having care that the evaporation is complete, and that no trace of humidity remains. If the layer of residue is very thick it is well to spread it out so that it may be penetrated throughout by the oxygen of the air. By following this advice you will surely avoid the inoculation of the microbes of putrefaction. When the residue is well dried it may be used for the inoculation. I usually place 1 or 2 centigrams of the dry residue in a gram of distilled water. I triturate it in such a manner that the mixture is as perfect as possible, and charging a Pravaz syringe, I make a subcutaneous injection in the right arm.

The results are various, but no serious accident has ever occurred. I was first inoculated, September 29, 1881. I felt a lively pain at the moment of the injection and some minutes after, but it disappeared promptly to give place to a slight tumefaction without redness of the skin, which interfered somewhat with the movement of the arm. The fourth day all had disappeared, and I really had no febrile movement, since the thermometer did not go more than a few tenths above 37° ; the urine became scanty and took a slightly reddish color. The malaise was insignificant and I continued my ordinary occupations.

I count, to day, nearly two hundred persons inoculated, and among them several experienced, some hours after the inoculation, a febrile movement, which sometimes caused the thermometer to mount to 38.5° . The duration of this febrile movement did not exceed twenty-four to thirty hours. The local accidents have been most varied. There was almost always tumefaction at the point of inoculation, but the extent and size of this tumefaction varied greatly. In many cases there was redness of the skin. These local phenomena lasted four or five days, but in general those inoculated continued about their ordinary affairs. Once only I have seen developed a phlegmon which terminated by suppuration.

RESULTS OF DR. CARMONA'S INOCULATIONS.

In an appendix of his "*Leçons sur l'étiologie et la prophylaxie de la fièvre jaune*," Dr. Carmona has given a detailed statement of his inoculations and their results, from which I shall quote with such comments as seem called for.

When my lessons upon the etiology and prophylaxis of yellow fever were already in press, together with the preface written for them by my friend Dr. Edward Liceaga, professor of operative medicine in this faculty, and president of the superior council of health, I had occasion to study upon a greater scale the effects of the protective inoculations, both because the number of persons who desired to be inoculated increased from day to day, and by reason of the invitation which I received from General Ignacio Revueltas, under-secretary to the minister of war and of the navy, to inoculate the garrison at Vera Cruz. This opportunity to study in detail the effects of protective inoculations made me decide to adjourn the publication of my "*lessons*" until I could give an account of the result obtained in the garrison at Vera Cruz.

I should remark that the protective inoculations were made in the last days of the month of May, 1885, precisely in the period when the epidemic of yellow fever was on the increase.

The method employed was the same that I have indicated in my "*lessons*." *I took the urine of patients with yellow fever and without other preparation I abandoned it to spontaneous evaporation. When the residue was entirely dry, I took a centigram of it and dissolved it in distilled water, and by means of a Pravaz syringe, I introduced this liquid into the cellular tissue on the posterior face of the left arm.*

Up to the present time, November 6, I have made one thousand three hundred and fifty-eight inoculations without including those which were made at Colima, Sinaloa, Sonora, and Oaxaca. I think it useful to make the remark that in no case has there been any serious accident as the result of the inoculations, notwithstanding the fact that the residue of the urine is formed exclusively by millions of zoospores thrown off by the patients. Besides, *I insist upon this fact, that I have never had recourse to any method of attenuation. The number of persons inoculated being already considerable, I think I am authorized to say that the zoospores penetrate without any danger into the animal economy, and consequently that it is completely useless to seek to attenuate the virus.*

I ought, however to observe that in order that the inoculation may be inoffensive it is absolutely necessary to evaporate the urine completely, until it is perfectly dry, and to

make the inoculations in localities which are not visited by yellow fever; or if one is obliged to make them in infected localities they should be practiced during the period of the year when the disease has not yet declared itself.

I have already mentioned in my "lessons" the possibility of producing yellow fever in cases in which the inoculations are made in the infected localities and at the time when the epidemic is developing. This doctrine which up to that time was only hypothetical has unfortunately been confirmed. In the month of May of this year when the epidemic of *romito* commenced to develop at Vera Cruz, six prisoners were inoculated, and in two of these the local symptoms of the inoculation were followed immediately by those of grave yellow fever and both died some days after, upon the same day.

These fatal results, not having presented themselves in the one thousand three hundred and fifty-eight inoculations made in localities where yellow fever has never existed, makes us see the truth of the doctrines established in my "lessons." It must not be forgotten that in localities where yellow fever reigns and in times of epidemic a mucedine is developed either in the residue of the urine or in blood drawn from yellow-fever patients. It is necessary also to remember that observation has shown that this mucedine does not develop every year, nor in every season of the year, but that its development coincides with the appearance of epidemics of yellow fever. *So long as this mucedine does not develop there is no yellow fever, and as soon as yellow fever appears the same mucedine develops as well in the sediment of the urine as in the blood of the sick.*"

Remarks.—As Dr. Carmona has abandoned the "mucedine" as an etiological factor in the production of yellow fever it is unnecessary to enter upon a critical discussion of the above-quoted explanation of a fact which appears to us to admit of a very simple explanation. Six prisoners living in an infected locality were inoculated by Dr. Carmona's method; two of the six fell sick with yellow fever soon after the inoculation and died. One thousand three hundred and fifty-eight persons inoculated outside the infected area did not suffer an attack of yellow fever as a result of the inoculations made, nor did four of the six prisoners referred to. Evidently the fact that two inoculated prisoners living in an infected area fell sick and died from the prevailing sickness can not properly be ascribed to the inoculation practiced, unless it be that this may have acted as a secondary cause—just as inebriation, excessive fatigue, etc., may act in presence of the essential and specific first cause to develop an attack of this and other infectious diseases. On the other hand the two cases furnish evidence which is not favorable to the supposed protective power of the inoculations practiced.

After having demonstrated the perfect innocuity of the preventive inoculations, made according to the rules which I have recommended and after having made known the dangers of making them in the localities infected by the *romito*, above all when it reigns as an epidemic, let us pass to the study of the results obtained, and to make known the degree of confidence that we may have in considering them as a means of prophylaxis against yellow fever.

The first two hundred and eight preventive inoculations that I practiced were made with the zoospores of a urine which I had preserved since the year 1881. This residue, which it may be said in passing is very arid of atmospheric moisture, had become liquid several times and had again become dry. The zoospores which existed in it were endowed with very free movements, and when we put a small quantity in a drop of water they became intimately mingled with this fluid and only a small number remained in conglomerates.

This residue served me to inoculate all the persons upon whom I practiced this operation up to the 3d of January, 1885. Very well, none of these individuals was attacked by yellow fever, notwithstanding that all were exposed for a longer or shorter time to the action of the morbid principle, and that many of them have already passed through several epidemics of yellow fever, some in Havana, others at Vera Cruz, Mazatlan, Colima, in Lower California, etc.

M. Joaquin del Villar and a civil engineer experienced at Mazatlan symptoms so benign that they scarcely attracted attention. M. del Villar, who after twenty-four hours of malaise had a slightly yellow tint, only gave up his daily occupations for a single day.

I wish to speak of some particular facts because they may serve to make known the value of the prophylactic method. More than one hundred persons were sent by the Government to the Universal Exposition at New Orleans, who were inoculated with the residue of the urine of which I have spoken, and notwithstanding the fact that they remained in this city after the appearance of yellow fever none of them were attacked.

We remark here that yellow fever did not prevail in the city of New Orleans during the year of the Universal Exposition, and that thousands of unacclimated persons from various parts of Europe and from the northern portion of our own country visited New Orleans during the Exposition without contracting yellow fever, although they had not been inoculated by the method proposed by Dr. Carmona.

On the seventh, eighth, and ninth of November, 1887, I inoculated thirty-eight persons of an opera bouffe company which was on its way to Vera Cruz and to Havana in order to give theatrical representations. The *romito* reigned in these two cities, and notwithstanding their own avowal that they had given themselves up to all sorts of excesses none of these artists were attacked with yellow fever.

With reference to these thirty-eight persons we would remark that as they visited the cities of Vera Cruz and Havana during the winter season—that is to say, soon after their inoculation on the 7th, 8th, and 9th of November—they were not exposed to any test worthy of consideration. Strangers are in the habit of visiting these infected cities during the winter months, and they do so with impunity. We therefore find no evidence thus far of the protective value of the inoculations practiced.

At the commencement of the year 1884 ten persons from Mexico set out for Mazatlan for the purpose of establishing themselves there. Four of them were inoculated, and none of these were attacked with yellow fever; the six others who did not take the same precaution were successively attacked and all died.

This seems more like evidence of protective value; but in the absence of exact data as to the exposure of the ten persons after their arrival—that is to say, whether it was identical in all the cases of those inoculated and those not inoculated—and in the absence of a nominal list and verification of the alleged facts by some one on the spot, we can not give great weight to this evidence.

From the 4th of January to the middle of June of the present year I have inoculated five hundred and thirty-two persons, and these inoculations were made with the residue of urine which had been dried without being subjected to alterations of moisture and dryness such as the residue first used had suffered. I insist upon this detail for reasons which I will explain later.

Among the five hundred and thirty-two inoculated were three hundred and sixty-two soldiers who composed the garrison of Vera Cruz, two hundred and eighteen more who had been inoculated by me in Mexico the 10th of May, making a total of three hundred and eighty who, not having been born in the locality and not having had yellow fever, were exposed to the contagion of the epidemic which commenced to develop. This group formed of three hundred and eighty soldiers of the garrison of Vera Cruz is the more important for our study: First, because they were inoculated when the epidemic of Vera Cruz commenced to develop and because they were obliged to pass through it at the said port; second, because their number was considerable and they lived in the same hygienic conditions, and as they could constantly be observed the results ought necessarily to be more certain; and third, because one could establish a comparison between this group of inoculated persons and the convicts who were not. It must be remembered that the epidemics of yellow fever at Vera Cruz when they attain a certain degree of intensity, as that which has just passed, make great ravages among the soldiers, and it is not rare to see in such conditions that the half or the third of the garrison is attacked. There have even been cases, in years when the epidemic was very severe, when an entire battalion has been attacked.

I ought also to state that the figures I am about to give are all those which have been received officially by the minister of war, and that the information has been collected at Vera Cruz by physicians who have not shown themselves to be partisans of the doctrine of inoculation. Besides, I have never disputed the diagnosis, and having confidence in the loyalty and good faith of my confrères, I have accepted without hesitation all the cases of yellow fever which they have judged as such.

I will mention by name the persons attacked, because I wish that every one may be convinced that I do not conceal any misfortune, being persuaded, as I am, that to deceive others would be to wish to deceive one's self, and that in matters of observation deception could not last for a long time. The table No. 1 shows the sanitary condition of Vera Cruz (so far as yellow fever is concerned) before the inoculations were made.

TABLE NO. 1.

	January.		February.		March.		April.		May.	
	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
Military hospital	12	4	4	3	6	5	4	4	31	15
Civil hospital, San Sebastian.....	0	0	0	0	0	0	0	0	6	1
Civil hospital, Loreto.....	1	1	0	0	0	0	2	2	2	0
Total	13	5	4	3	6	5	6	6	39	16

The month of May, during which the epidemic commenced to augment, was the moment chosen to make the inoculations at Orizaba. We must remark that the troops commenced to go up after the 19th of the same month in little groups, going away in this manner from the infected locality. The inoculations terminated the 31st of May, except a group of artillerymen, who were inoculated June 5, and another on the 12th of the same month.

However small the number of days during which each group was separated from the infected locality, it is evident that the number attacked in the month of May was always less than it would have been if their stay in Vera Cruz had been permanent; considering above all that the inoculations lasted twelve days, which is nearly equal to half a month. I insist upon this circumstance, because we are going to establish a comparison between the number attacked during the month of May among the soldiers of the garrison and the non-acclimated prisoners—*forçats*.

Of the thirty-one admitted to the military hospital during the month of May, sixteen were prisoners and fifteen soldiers; but two of the latter were attacked at Orizaba, having carried the germ from Vera Cruz. So that in the month of May there were seventeen soldiers attacked and sixteen prisoners. It is almost certain that if the troop had not removed from Vera Cruz there would have been a greater number of sick. At the end of May there remained one hundred and seventy-three *forçats* not inoculated and not acclimated, who will be compared with three hundred and eighty soldiers, not acclimated, but already inoculated. The proportion is then 2.2 of the second for 1 of the first.

The epidemic had little intensity during the first four months of the year, but already in the month of May eight cases had been admitted to the civil hospitals, and as we will see further on the epidemic became more intense during the following months.

Table No. 2 shows the number attacked and the deaths during the entire epidemic, explaining with care the number inoculated.

TABLE NO. 2.

1885.	Military hospital.				San Sebas- tian.		Loreto.		City.
	Prisoners.		Inoculated soldiers.						
	Admit- ted.	Died.	Admit- ted.	Died.	Admit- ted.	Died.	Admit- ted.	Died.	Died.
June	18	8	5	3	13	6	8	3	6
July.....	18	13	11	6	58	36	16	6	20
August.....	19	.....	10	8	41	29	9	6	30
September	9	.....	0	0	.....	10	.....	5	10
October	8	.....	0	0	.....	.....	.....	.....	.....

In studying this table we see at once that of the one hundred and seventy-three prisoners not inoculated, seventy-two were attacked during the five months in which the epidemic was most intense; that is to say a little less than 42 per cent.. while of the three hundred and eighty soldiers inoculated only twenty-six were attacked, or a little less than 7 per cent. We see, also, that in the months of September and October there were no cases in the last group, although the epidemic continued with considerable force.

At the end of the month of July one hundred and seventy-four soldiers, not inoculated, for the most part coming from Tabasco, arrived in Vera Cruz; these were immediately influenced in a most intense manner, so that in the month of August seventeen of these soldiers were attacked by yellow fever; in adding these seventeen to the nineteen prisoners (forçats) and the ten inoculated, we have in all forty-six attacked; the total number admitted to the military hospital. In the month of September there were twenty-one attacked among the newly-arrived soldiers, which, added to the nine prisoners noted in Table No. 2, makes a total of thirty admitted, the number in the military hospital in the said month of September. In October there were eight prisoners attacked and eighteen of the newly-arrived soldiers, making a total of twenty-six admitted. *In September and in October none of the inoculated were attacked with yellow fever.*

It has not been possible for me to ascertain the number of prisoners who died in the months of August, September, and October, because in the documents received the total number of deaths among the non-inoculated soldiers and prisoners is given for the different months, but without mentioning the respective number of each. In the month of August there were twelve deaths among the prisoners and soldiers not inoculated, which, united to the eight inoculated who died, makes a total of twenty deaths for the month of August. In the month of September twenty-three persons died among the prisoners and soldiers not inoculated, but I do not know what was the number of the former and what of the latter. In October there were thirteen deaths out of twenty-six admitted.

From all these facts it results, first, that of the three hundred and eighty inoculated there were twenty-six attacked and seventeen died in the months of June, July, and August; second, that in September and October none of the inoculated were attacked, notwithstanding that the epidemic struck a good number of victims among the non-inoculated.

If we compare these results with those among the non-inoculated prisoners we will see that, having had among them seventy-two attacked, it is easy to establish a proportion, saying that if one hundred and seventy-three gave seventy-two cases, how many should three hundred and eighty give? The number of attacked should have been one hundred and fifty-eight; there were only twenty-six. It follows that the inoculation prevented one hundred and thirty-two cases of yellow fever, of such a gravity that nearly 50 per cent. of the sick died.

A comparison of the mortality among these prisoners with that of a group of soldiers living in comfortable barracks and under much more favorable hygienic conditions appears to me to be without any scientific value, and the same may be said with reference to the comparison of the soldiers who were inoculated in the month of May and among whom twenty-six cases and seventeen deaths are said to have occurred, with the one hundred and seventy-four non-inoculated soldiers who came to the city the end of July. We are not informed how long the soldiers composing the garrison of Vera Cruz had been stationed in that city prior to the date upon which they were inoculated, and how many "acclimated" men were included in the number given; on the other hand, the one hundred and seventy-four soldiers, not inoculated, who arrived the end of July, are stated to have come, for the most part, from Tabasco, a town in the interior. The fact that the original garrison of Vera Cruz, inoculated in May, after losing seventeen men out of twenty-six attacked with yellow fever during the months of June, July, and August, should have sustained no further losses in September and October seems to me quite in accordance with what often occurs under similar circumstances, and the considerable losses during these months occurring in a newly-arrived detachment also corresponds with what has frequently occurred in other localities, where, after the termination of an epidemic as a result of the exhaustion of susceptible material, a new outbreak follows the arrival of unacclimated persons.

Moreover, Dr. Carmona states on the following page of his memoir that during the month of May, before the inoculations were practiced, there had been seventeen cases and eight deaths from yellow fever in the garrison, so that the three hundred and eighty inoculated had already been exposed without contracting the disease, and were in fact persons who had shown a certain insusceptibility in presence of the malady; that is to say, they were the survivors of a larger number which had already suffered a considerable loss.

Of all the figures given by Dr. Carmona, the most important for us, as bearing

upon the prophylactic value of his method of inoculation are those which inform us that twenty-six of those inoculated were seized with yellow fever, and that seventeen of these died. Dr. Carmona's confrères in Vera Cruz seem to have taken the same view of the case, for so far as I could learn they were not convinced of the value of the method, and it has not been practiced in Vera Cruz since the date of the above-mentioned experiment upon the military garrison of the city.

Dr. Carmona has attempted to account for the mortality among those inoculated at Vera Cruz by supposing that "some of those inoculated may not have received a sufficient quantity of the microbes for the perfect saturation of the economy." He says:

When in the month of June I learned that some of my inoculated were attacked with yellow fever, I asked myself if the want of success was not, perhaps, due to the fact that by the simple evaporation of the urine the albumen remaining in the residue conglomerated the zoospores, rendering them heavy and but slightly mobile. In this condition it might well be that some of those inoculated had not received a sufficient quantity of microbes for the perfect saturation of the economy just at that time. I was to inoculate seventy-eight soldiers who were about to set out for Acayucan, and I resolved to control the results of the inoculations made with the residue, such as I had prepared up to that time, and for this purpose I had the seventy-eight soldiers inoculated by Dr. Mondragon with preparations similar to those which we had employed in the inoculations made at Orizaba. Four days after we studied with the microscope the blood of some of these soldiers, and we found that the quantity of zoospores was the greater when the person had received the last portions of the virulent liquid. Thus, in the blood of the first inoculated one saw scarcely any zoospores, while in that of the last there was a considerable quantity.

The result of this experiment shows that the twenty-six unsuccessful cases were probably due to the fact that all of the soldiers inoculated have not received the quantity of zoospores necessary to saturate the economy, and consequently that it is necessary to stir the virulent liquid before each inoculation, or to remove the albumen by heat or by alcohol before evaporating the urine.

Knowing that the zoospores are not altered either by alcohol or by the temperature which coagulates albumen, I have not hesitated to submit the urine to a temperature of 76° , and after cooling I filtered it and left it to spontaneous evaporation. By this proceeding one loses, without doubt, some microbes which remain attached to the albuminous precipitate, but in compensation those which we obtain have a great mobility, and but few conglomerations remain.

Remark.—Extended experiments made by the writer* show that the vitality of micrococci, such as Dr. Carmona showed to me in his laboratory as zoospores, and such as were present in the culture which he kindly gave me, are destroyed by a temperature much lower than that above mentioned, and I have proved by direct experiment that a temperature of 60° C., maintained for ten minutes, sterilizes Dr. Carmona's cultures so far as micrococci are concerned. I must therefore regard the above procedure as fatal to his so-called zoospores, and can not accept his explanation of the subsequent exemption from attack which the seventy-eight soldiers inoculated with this material are said to have enjoyed. Dr. Carmona says:

With the zoospores obtained by the new method I reinoculated seventy-eight soldiers, who were to set out for Acayucan, and I recommended that the liquids should be more charged with zoospores. Of these seventy-eight soldiers, two remained in Mexico and seventy-six went to Vera Cruz in the month of July on their way to Acayucan. One, Francisco Gonzalez, who set out without being inoculated, joined the seventy-six inoculated. They remained in Vera Cruz six days, and notwithstanding that during this month the epidemic was very severe, and notwithstanding that these soldiers descended to the coast for the first time, none of them were attacked with the *vomito*. One died of peritonitis, according to what Dr. Palazuelos has written me. Upon their arrival in Acayucan, Francisco Gonzalez, the only one not inoculated, fell sick with the *vomito* and died a few days after. All the others remained in perfect health.

Remarks.—The facts as above stated seem to support Dr. Carmona's claims as to the protective value of his inoculations, although the time during which the men re-

* The thermal death-point of pathogenic organisms. Am. Journal of the Medical Sciences, July, 1887.

mained in Vera Cruz was rather short for a satisfactory test and we are not informed where they remained and can not form a judgment as to the real exposure to which they were subjected. In view of all that has been said thus far, and in the absence of any precise information other than that contained in the above quoted extract, I must still retain my position of scientific skepticism with reference to the protective value of Dr. Carmona's inoculations. Indeed, Dr. Carmona himself very frankly admits, in closing his account of the laudable attempt which he has made to demonstrate by experiment the value of his method, that the demonstration is not sufficient to comply with the exactions of science. He says:

I do not suppose that what has been done up to the present time is sufficient in order that the method of prophylaxis which I propose may be admitted in a definitive manner by science; but I believe that the results are sufficiently significant to animate practitioners, so that statistics upon a greater scale may be obtained to decide the question. If my doctrines are realized I shall consider myself very happy to have furnished to humanity the means of avoiding one of the most terrible scourges which has ever afflicted it.

CONCLUSIONS.

Facts relating to the endemic and epidemic prevalence of yellow fever, considered in connection with the present state of knowledge concerning the etiology of other infectious diseases, justify the belief that yellow fever is due to a living micro-organism capable of development under favorable local and meteorological conditions, external to the human body, and of establishing new centers of infection when transported to distant localities.

Inasmuch as a single attack of yellow-fever, however mild, protects as a rule from future attacks there is reason to hope that similar protection would result if a method could be discovered of inducing a mild attack of the disease by inoculation, or otherwise.

The hypothetical yellow-fever germ, multiplying external to the human body in unsanitary places in tropical regions where the disease is endemic, or during the summer months in the area of its occasional epidemic prevalence, establishes infected localities, and susceptible persons contract yellow-fever by exposure in these infected areas. We infer, therefore, *a priori*, that the yellow-fever germ invades the system by the respiratory tract, by the alimentary canal, or from the general surface of the body, and it should be found in the blood and tissues, or in the alimentary canal, or upon the surface.

Another possibility presents itself, viz, that the germ multiplying in unsanitary localities external to the body produces a volatile poison which contaminates the air, and that an attack is induced by the toxic effects of this potent chemical poison. The more or less prolonged period of incubation—two to five days—in numerous cases in which the attack has been developed after removal from the infected locality is opposed to this latter hypothesis.

In the light of what is known of the etiology of other infectious diseases, the hypothesis that the germ really finds entrance to the body of the person attacked and multiplies within it is that which presents itself as most probable, and it hardly seems worth while to consider any other, unless this is proved by a complete investigation not to be true.

Naturally the attention of investigators has first been given to a search for the "germ" in the blood of those attacked and in the blood and tissues of the victims of the malady.

The researches made up to the present time have failed to demonstrate the constant presence of any micro-organism in the blood and tissues of those attacked.

My own researches, recorded in the foregoing report, show that no such micro-organism as Dr. Domingos Freire, of Brazil, has described in his published works, or as he presented to me as his yellow-fever germ at the time of my visit to Brazil, is found, as he asserts, in the

blood and tissues of typical cases of yellow fever. There is no satisfactory evidence that the method of inoculation practiced by Dr. Domingos Freire has any prophylactic value.*

The claims of Dr. Carmona y Valle, of Mexico, to have discovered the specific cause of yellow fever have likewise no scientific basis, and he has failed to demonstrate the protective value of his proposed method of prophylaxis.

It is highly important, in the interest of science and of the public health, that further investigations be made by more exact methods, which have been perfected since Drs. Freire and Carmona made their researches, and with which they were evidently not familiar.

The failure thus far to find a specific micro-organism in the blood or tissues makes it desirable that a thorough research should be made with reference to the micro-organisms present in the alimentary canal, for it is possible that in yellow fever, as in cholera, the disease is induced by a micro-organism which multiplies in this situation. Additional researches are also required before we can say definitely that there is no germ demonstrable in the blood and tissues. Having exhausted our resources by the method of direct examination, and by cultures from blood drawn during life, it is highly desirable that various culture media should be inoculated with material taken, with proper precautions, from the various organs, at the earliest possible moment after death.†

POST SCRIPTUM.

BALTIMORE, September 23, 1889.

In his attempt to neutralize the force of my evidence and to establish his claim to have discovered the specific microbe of yellow fever, Dr. Domingos Freire has referred to the observations of Babes, of Finlay and Delgado, of Gerard and of Rangé as confirming his own. As a matter of fact the observations of the gentlemen referred to give no support whatever to this claim, inasmuch as none of them have described anything corresponding with the "*Cryptococcus xanthogenicus*," or even with the micrococcus which he presented to me as his yellow-fever germ.

Thus the micro organism found by Babes in material sent to him from Dr. Lacerda's laboratory in Rio de Janeiro is a short bacillus, arranged in chains, and not a micrococcus (see fig. 3, p. 173, and compare fig. 1, p. 160). Babes himself has reported his failure to find this bacillus in material from other sources, and his researches show the absence of Freire's micrococcus in the material examined by him, as this is easily stained by the aniline colors, and if present could not have escaped the observation of so accomplished a microscopist and bacteriologist. In the second edition of "*Les Bactéries*" Babes says:

Since these researches we have had the opportunity to examine several series of sections from yellow fever. First, the liver and kidney of two individuals dead from

* NOTE.—My more recent researches made in Havana in 1888 (ten autopsies), and in 1889 (thirty autopsies), fully confirm this conclusion.

BALTIMORE, September 21, 1889.

† The writer went to Brazil and to Mexico fully prepared to make the experiments indicated, but, unfortunately, was not able to secure any autopsies in either place, and the limit as to time fixed by his orders made it necessary for him to return to the United States without having made these important researches.

Since the above was written I have made extensive researches of the kind indicated, having made ten autopsies in typical cases in the military hospital in Havana in the summer of 1888, three autopsies during the epidemic at Decatur, Ala., in the autumn of the same year, and thirty autopsies in Havana during the summer of the present year (1889). The results of these investigations will be recorded in detail in a report to be submitted hereafter.

SEPTEMBER 1, 1889.

this malady, collected by Dr. Alvarez, were examined in the Laboratory of Pathological Anatomy of the Faculty of Paris, without any bacteria having been found; second, material from three cases of yellow fever which Koch was kind enough to confide to one of us. In these last three cases, notwithstanding the most scrupulous research, and notwithstanding the advice of Koch, it was impossible to find the little chains in the brain, the kidneys, the liver, and the spleen. We must suppose, then, that in yellow fever, as in other infectious maladies, microbes are only found in the parenchymatous organs in certain cases, and not in all. The question whether these micro-organisms really constitute the cause of the malady, or simply a complication, is consequently not resolved.

The extended researches of my friend, Dr. Carlos Finlay, of Havana, also give no support to Fréire's claims, inasmuch as the micrococcus in tetrads, which has especially engaged his attention, and which for a time he believed to be the specific etiological agent in the disease under consideration, is entirely distinct from the micrococcus of Fréire. Finlay's *micrococcus tetragenus febris flavæ*, which I have called *micrococcus tetragenus versitilis*, a name which he accepts, is a large coccus in tetrads, which differs essentially, both in its morphology and in its growth in culture media, from the micrococcus of Fréire. This I can assert most positively, as I have had authentic cultures of each, given me by the gentlemen themselves, under continuous observation for nearly two years.

Moreover, I have made extended culture experiments in Havana during the past two years, which show conclusively that neither of these micrococci is present in the blood of yellow-fever cadavers, withdrawn from the heart or the liver shortly after death. In one case only out of thirty-five autopsies in which I have made cultures from the liver, I have obtained the "tetragenus" of Finlay, and I have not encountered the micrococcus of Fréire in a single instance. On the other hand, I have obtained both of these cocci in cultures from the surface of the body of patients in the hospitals of Havana, and the "tetragenus" is one of the most common micro-organisms encountered in such cultures, whether made from the surface of yellow-fever patients or those suffering from other diseases.

With reference to the observations of Gerard it is evident from his own account that if he encountered micrococci they were associated with spore-forming filamentous bacilli, and that he was entirely unfamiliar with this class of micro-organisms. As he is not known as a bacteriologist and has not given a detailed account of his methods of research, no scientific value can be attached to his observations. In a translation of his report made by Dr. Wolfred Nelson and published in the Canada Medical Record of July, 1886, I find the following account of the morphology of the micro-organisms encountered by him:

In the month of June, 1882, in a report to the superior agent of the Inter-oceanic Canal Company, resident in the city of Panama, South America, I had the honor to inform him that I had found in the blood of yellow-fever patients some microscopic organisms—some filiform, others resembling a string of beads (*chaplets*), and, lastly, brilliant little bodies. That the organisms were constant in appearance, and could thus serve as elements for diagnosis.

After some trials and a great many failures I succeeded in isolating the microbes, and obtained them in great quantity without the human body by artificial cultivation, in liquids suitable for their nutrition and reproduction.

I was then enabled to study the mode of existence of the microbes. If one observes the filiform bodies attentively for a given time he perceives in their transparent and homogeneous substance a series of small corpuscles that reflect light more than the other parts of the microbe. Little by little these corpuscles arrange themselves around a central axis or core, giving the organism the appearance of a string of beads, *chaplet*. (This French word signifies the string of beads "told" by devout Catholics while praying.) Soon other changes follow, the string-like formation separates, and in place thereof nothing remains but a mass of brilliant little points. The size of the little points is about the thousandth of a millimeter. These corpuscle germs have great resistance. *They do not perish by drying, and can after many years serve to propagate the disease by regenerating the filiform bodies when placed under favorable conditions.*

Compare this with Dr. Fréire's account of the morphology and mode of development of his *Cryptococcus xantrogenicus*. In his principal work, published in 1885, he says:

When we follow with care and attention the march of the development which characterizes the germs which produce yellow fever, we acquire a certainty that, com-

mencing to present themselves under the form of little points almost imperceptible, they afterward gradually increase in diameter until they attain considerable dimensions; so that the little beings, which at the outset had the appearance of little grains of sand, not measuring more than 0.001 millimeter to 0.002 millimetre in diameter, arrive little by little to such a development that they reach the dimensions of 0.005, 0.007, 0.008 millimeter, and sometimes even more in certain conditions. When they have attained the adult age these cells are broken at divers points and discharge their contents, composed of spores already formed, mixed with a viscous substance of a yellow color, composed of a pigment and protoplasmic substance, and of the liquids elaborated by the cells.

In an address delivered in Paris in 1887 Dr. Freire repeats this account of the mode of development of his cryptococcus. He says:

Each adult cell is ruptured at one or several points, and allows to escape its contents, composed of germs which are to perpetuate the species, and two pigments—one yellow, destined to infiltrate the tissues and to produce the icteric color which has given name to the malady; the other black, insoluble, etc.

Dr. Rangé, a medical officer of the French navy, whose researches have been repeatedly referred to by Dr. Freire as confirming his own, says in his report:

Unfortunately for our researches we did not possess high powers. I could not exceed 540 diameters, and I had no coloring matters for isolating the microbe in the blood, according to the method of Ehrlich; therefore I only give these details with reserve. The figured elements which we have drawn were met with in the black vomit of man, the contents of the stomach of guinea-pigs, in the cultures of blood and in condensed watery vapor, but in less number. They are agglomerations of cells, some round with a central nucleus; beside these, and with a more considerable development, we met with elliptical cells having the dimensions of a blood globule, and with a nucleus near one of the extremities of the greater diameter. These cells were found in groups of two or three, joined by the extremity containing the nucleus. This approached the periphery little by little; at this moment one observed a slight swelling, a sort of bud, which separated from the cell which had given it birth. Beside these elements, one finds others in the form of rods, large and short, not branched. These bacilli sometimes contain granules. We believe that they come from the elliptical cells, for we have followed under the microscope the phases of their transformation. But the absence of a didactic treatise, the absolute absence of bibliographic resources prevents us from making any positive affirmations with reference to these micro-organisms.

Notwithstanding the very just conclusion above reached, Dr. Rangé, at the end of his memoir, says:

In uniting these various results, shall we conclude that there is a *bacillus* of yellow fever, *bacillus icteroid*, and that it is possible to find a vaccine? We believe it without affirming it.

The above quotations will suffice to show any well-informed bacteriologist that the claim of Dr. Freire does not receive any support from the observations of the gentlemen mentioned, whereas several competent bacteriologists have reported their failure to find his "cryptococcus" or any other micro-organism in the blood.

Dr. Paul Gibier, who went to Havana in the expectation of finding what Freire had described, made researches by approved bacteriological methods and reports an entirely negative result. In a communication to the French Academy of Sciences he says:

HAVANA, January 22, 1888.

At the commencement of the year 1887 Dr. Domingos Freire, professor in the faculty of medicine of Rio de Janeiro, came to Paris in order to present to the scientific public his studies upon yellow fever. M. Freire was presented to me by Dr. Rebourgeon, who had studied this malady with him in Brazil. The laboratory of comparative pathology of the museum was opened to these *savants*, who resumed the experiments the results of which had previously been published by M. Freire. I was requested by M. Freire to examine the cultures which he had brought with him and to treat them by the new bacteriological methods which had not yet been applied in his researches. After these investigations, made in common, M. Freire had the kindness to associate me in a communication which he made in his own name and that of Rebourgeon to the Academy of Sciences during the month of March, 1887.

Since, and as a result of this communication, I received from the minister of public instruction the mission to go and "study yellow fever in the countries where it pre-

vails habitually, and the prophylactic measures which may be opposed to this malady." In the early part of November, 1887, I disembarked at Havana, where the yellow fever still shows itself at this epoche in the so-called *sporadic* form.

I give as succinctly as possible the results of my first investigations, which were made in the hospitals of Havana.

November 16.—Among several cases of yellow fever I chose that one which appeared to me to be the most grave, in order to collect blood and urine. Fifth day of sickness: Fever, albuminuria, black vomit, etc. Fatal case.

November 17.—In an autopsy practiced about eight hours after death, I collected blood from the left ventricle and from the right auricle. * * *

November 27.—Among several cases examined I collected, from the most severe, blood and black vomit. Fatal case.

December 14.—Case in fourth day of the disease: Albuminuria; collected blood, urine, and black vomit. Recovered.

December 22.—Clinical examination of a severe case: Abundant black vomit, buccal hemorrhage, etc.; 23d, autopsy of this case *made two hours after death*; collected blood from the heart. * * *

In order to avoid useless repetition I will detail in a general way the methods pursued in the examination of the liquids collected, with the precautions usual in bacteriological researches.

In each case several preparations of blood were examined in a fresh condition, then dried and stained; the same method was pursued with the urine and the black vomit.

Inoculations, by numerous punctures, were made in agar-agar jelly with blood, urine, bile, and serum from the pericardium. * * * Numerous thin sections of the various organs were also made; these were stained with a view to demonstrating the presence of microbes.

Results obtained.—I am obliged to confess here, however much it may cost me, that my results contradict in an absolute manner the facts advanced by M. Domingos Freire, from whom I have the regret, as well as the duty, to separate myself.

The blood.—In a great number of preparations, fresh or colored, it has been impossible for me to verify the presence of micro-organisms. The cultures, repeated a great number of times, remained sterile.

The urine. treated in the same manner as the blood, has constantly given a negative result.

The pericardial liquid and the bile, like the blood and urine, did not contain micro-organisms. I have found that even in the gravest cases seen by me the blood examined by the microscope did not present any appreciable trace of alteration of its elements.

The numerous sections which I have made of the different viscera also have failed to show me the presence of microbes.

Dr. D. Tomayo, of the bacteriological laboratory of the "Crónica Médico-Quirúrgica," of Havana, has also reported a negative result in his repeated examinations of blood drawn from the finger during life. His evidence is valuable both because he is a competent and conservative bacteriologist, having been instructed in the methods of research in Pasteur's laboratory in Paris, and also because he gives a detailed account of his method of collecting blood, which shows that he took extraordinary precautions to prevent accidental contamination of his cultures.

We quote from his paper published in 1888 as follows:

Analysis of the blood in yellow fever.—In collecting blood we have pursued the following technique: We have carefully washed the finger with soap and water; after that we have passed it through a hole made in a piece of impermeable linen a foot square; we have then washed the finger with ordinary alcohol, and afterwards with a solution of bichloride of mercury, and finally with a mixture of ether and absolute alcohol. We have also washed the isolating linen with a solution of bichloride and have covered it with a layer of glycerine; this done we isolated the finger in a little glass tube, "*cloche de cristal*," which had been washed with the sublimate solution and well heated. By this complicated technique we have endeavored to thoroughly cleanse the skin, to remove all grease and every microbe which might be in its folds and furrows, and thus to avoid infection by atmospheric germs. Then we sterilized a lancet in the flame of an alcohol lamp, punctured the skin, and allowed the first drop of blood which presented itself to escape, using only those drops which came later, and that at the moment of their appearance. Following this proceeding we have made *ensemencements* either with the platinum needle or with sterilized pipettes in agar-agar jelly, in peptonized gelatine, and in bouillon: we have also examined the blood collected in this way, in the artificial serum of Mulassey, filtered and sterilized, and lastly dried by the method of Koch. The patients from whom we obtained blood were in

the third and the sixth day of the disease; in another case the blood was collected at the moment of death. Up to the present time the cultures in agar-agar, in gelatine, and in bouillon contained in Pasteur flasks have remained sterile. * * *

THE MICROCOCCUS TETRAGENUS FEBRIS FLAVÆ OF DRS. FINLAY AND DELGADO.

My friend Dr. Carlos Finlay, of Havana, is a most enthusiastic and industrious investigator, but like many other pioneers in bacteriological research at a distance from the centers where the modern exact methods had their origin, at the time of making his first publications he was not familiar with the methods of isolating and differentiating micro-organisms, and fell into the usual and almost inevitable errors of inference as to the source and genetic relations of the various micro-organisms encountered by him in his earlier researches. He has since made himself familiar with the methods referred to and no longer insists upon the etiological relation of this micrococcus to the disease under consideration. I give below a letter received from him shortly before my departure from Havana:

HAVANA, August 29, 1889.

MY DEAR DOCTOR: I send you a copy of the résumé of our investigations during the year, May, 1888-'89, which Dr. Delgado and myself presented at the beginning of the year. You will see that we did not claim to have demonstrated that our "tetragnus" was the actual germ of yellow fever, but merely that in our recent investigations carried out with methods which we deemed to be reliable, we had again found the same micro-organism in yellow-fever finger blood and in blister serum, and also in cadaveric products of two yellow-fever autopsies. We likewise expressed the hope that you would undertake comparative experiments in order to determine, first, whether it was a fact that by the culture methods which we had described our tetragnus could be demonstrated in most of the products collected during life from yellow fever patients; and, second, whether that micro-organism is exclusively found in such patients.

I am aware that the results of three samples of yellow fever blister serum and seven samples of blister serum from acclimated subjects have given a negative answer on the second point. Yet I can not wholly divest myself of the suspicion that the greater frequency with which we have found the tetragnus in our yellow-fever cultures (from material collected during life) may have some significance, even admitting, as I do, that before any etiological importance could be claimed for it, quite a number of serious objections would have to be encountered, besides showing that it is not to be found in localities where yellow fever is unknown.

I remain, my dear doctor, yours very faithfully,

CARLOS FINLAY.

Dr. G. M. STERNBERG, U. S. Army, Havana.

As already stated, I have found this "tetragnus" of Drs. Finlay and Delgado to be one of the most common micro-organisms upon the surface of the body of patients in hospital, with various diseases, in Vera Cruz and in Havana. I also obtained it in specimens of blister serum collected by Drs. Finlay and Delgado from a case of brain disease, and from a case of skin disease, both of which cases were isolated from any association with yellow fever patients. The blister serum was collected from these cases and brought to my laboratory for the purpose of making a comparative research. I also frequently encountered colonies of the "tetragnus" in my laboratory in Es-march tubes which had been inoculated with pure cultures of other micro-organisms, showing that it is quite a common atmospheric "germ" in the city of Havana.

In a recent report made by Asst. Surg. J. J. Kinyoun to the Supervising Surgeon-General of the Marine-Hospital Service he states:

The micro-organism described by Dr. Carlos Finlay (vide London Lancet, September 1, 1887), has been under observation during the past year.

Experiments made upon various animals gave no results. Later, while the observations on malarial fever were under way, this organism was discovered upon the skin of a majority of the patients suffering from malarial fevers, the patients hailing from Portland, Me., to Vera Cruz, Mexico.

THE CHARGES OF DR. DOMINGOS FREIRE.

In an address delivered before the College of Physicians of Philadelphia, and published in the Medical News of April 23, 1889, the writer gave a summary statement of

the results of his investigations in Brazil and in Mexico. In a pamphlet published in Rio de Janeiro during the present year and widely distributed by the author, Dr. Freire has made a desperate effort to sustain his previous claims and to neutralize my evidence by a virulent personal attack.

Dr. Freire's brochure referred to is divided into two portions, a "*partie technique*" and a "*partie morale*." So far as the "*partie technique*" is concerned, I must leave the reader of the foregoing report and of Dr. Freire's publications to judge for himself of the value of the evidence presented, but I will as briefly as possible answer the charges made in the "*partie morale*." Dr. Freire, says:

When Dr. Sternberg arrived in Rio Janeiro I was in Paris. I had not left any one as my substitute in my absence, and there was no official commission in existence occupied with my experiments. What should he do in such a case in order that his conduct might be correct? He should have awaited my return, so much the more as every one knew by the news given in the newspapers that I would return to Brazil without delay. The most elementary politeness imposed upon him at least the duty of sending me a letter or a telegram, making known to me his arrival, and urging my return. He has done nothing of the kind.

I would simply say in reply to this that having been informed that Dr. Freire was about to return to Brazil, it did not occur to me that I was called upon to address him a letter or telegram announcing my arrival. And as I had no time to lose in waiting for his return, inasmuch as my orders required me to complete my investigations in Brazil and in Mexico by the 1st of October, I at once commenced the researches with which I was charged, devoting myself especially to inquiries among the physicians practicing in Rio and to personal researches in the localities where Dr. Freire's inoculations had been practiced. I may also remark here that my visit to Rio during the non-epidemic season was not a matter of choice, but was in obedience to my orders (see p. —). I was not consulted with reference to the date of my departure, or the length of time I might consider necessary to complete the investigation with which I was charged; and, as an officer of the Army, I had nothing to do but to obey the orders signed by the President of the United States to the best of my ability and without question.

Dr. Freire goes on to say:

On the contrary, his first care was to put himself upon intimate relations with my declared enemy, Dr. Araujo Góes, whom he refers to in his report as his friend. * * *

As I have stated in the introduction to my report, upon my arrival in Brazil, in company with Governor Jarvis, United States minister, I made an official call upon the Baron Cortegne, prime minister of the Empire. The minister informed me that Dr. Freire was absent and advised me to make the acquaintance of Dr. Araujo Góes, a member of the central board of health, in whom the government had the utmost confidence. That Dr. Góes still enjoys the confidence of the government is shown by the fact that during the recent epidemic he was sent to Santos and to Campinas to establish hospitals and attend to the sanitary police of those cities.

It so happened that Dr. Góes was living in the same hotel in which I had established myself, and which was also the residence of the United States minister and the usual stopping place of Americans coming to the city of Rio. Naturally I hastened to make his acquaintance, and have every reason to congratulate myself upon having done so. "I found him to be an extremely well-informed physician, a competent microscopist, and one of the pioneers in Brazil in bacteriological studies, especially with reference to yellow fever. He has been prudent enough not to publish prematurely the results of his investigations, but has made extended experimental studies, and has especially devoted himself to the microscopical examination of sections of the various organs, made *secundum artem*, and stained with various aniline dyes." (Quoted from the introduction to my report, p. 142.)

In Dr. Freire's first publication upon the etiology of yellow fever he refers to Dr. Góes as follows:

These liquids, like the blood, the black vomit, the yellow vomit, the saliva, the pus, etc., constantly contain, as we have already said, innumerable microscopic

beings, which I have had occasion to show to physicians and distinguished specialists, among them Drs. Caminhoá, professor of the faculty of medicine, and Aranko Góes, professor of natural history, in the Imperial College of Pedro II. To this last confrère, *whose modesty equals his intelligence*, I present my thanks for his useful collaboration. (*Recueil de Travaux Chimiques*, etc., 1880, p. 266.)

Dr. Góes's scientific conservatism and "modesty" has prevented him from announcing any pseudo-discoveries, but has not prevented him from pointing out the errors and absurdities into which Dr. Freire has fallen and the unreliable character of his statistics. This he has done at the meetings of the Imperial Academy of Medicine, and his criticisms, which are upon record in the proceedings of the academy, show a truly scientific spirit, and in my opinion are well founded. This, I believe, is also the opinion of a majority of the members of the academy and of the best informed physicians in Rio.

Dr. Freire goes on to say:

In company with this gentleman, without my being informed, profiting by my absence, Dr. Sternberg has invaded the bacteriological laboratory of the faculty of medicine without the authority of the director of the faculty, and they have opened the closets in which were contained articles belonging to me, closets which I had left closed with a key which I had carried away with me. They have withdrawn the cultures which I had left there, because they were impure and of no value, etc.

This charge is simply untrue. I did, in company with Dr. Góes, call upon the director of the faculty of medicine, and this gentleman conducted me to the bacteriological laboratory and placed it at my disposal. That this is the fact he certainly will not deny, and my statement is supported by the letter of Dr. Góes, which I introduce below. In order to support his statement Dr. Freire publishes a document, signed by the secretary of the faculty, to the effect that "There does not exist in the office of the secretary of the faculty any document in virtue of which one can conclude that the director of the faculty, may have accorded to Drs. Francisco Marques de Aranko Góes and Dr. George Sternberg the permission to work in the section of bacteriology annexed to the laboratory of organic chemistry during the absence of the one asking the question—*du requérant*," being in response to a written question formulated by Dr. Freire.

The absence of such a written document is not surprising. I made no written request, and was conducted to the laboratory by the director of the faculty in person. That I would venture in a foreign city to invade without authority a closed laboratory in a building with which I was entirely unfamiliar, is too preposterous to demand attention were it not for the formal manner in which Dr. Freire has made the charge and the show of introducing documentary evidence, with which he has attempted to convince those who may read his pamphlet that I have been guilty of gross misconduct.

The second portion of the charge is equally untrue. Dr. Freire's two assistants, Dr. Chapot Prévost and Dr. Caminhoá, called upon me immediately after my arrival and offered me their services. My first visits to Dr. Freire's laboratory, after it was placed at my disposal by the director of the faculty, were made by appointment with these gentlemen, and one of them selected from the locked closets, of which he carried the key, the culture which I examined. Moreover I only mention incidentally the fact that these cultures were impure. I accepted the culture which Dr. Freire subsequently brought from Paris as an authentic culture of his yellow-fever microbe, and my conclusions relate to this micrococcus.

The following is a translation of Dr. Góes's reply to Dr. Freire's attack upon me, made in a medical congress held in the city of Rio, and subsequently repeated in his pamphlet referred to:

[Translation.]

TO DR. DOMINGOS FREIRE:

Not being possible in the medical congress to continue a discussion which ceased to be scientific to become personal, I must use the public press to give a prompt reply to the discourse of Dr. Domingos Freire emitted yesterday. As for the insults which he heaped upon me, I will not repel them, for he who takes advantage of his position

which protects him from interruption, to insult an opponent bound by the regulations (of the congress) is neither a gentleman nor a polite man, consequently his insults can do me no harm; they can only injure himself. As to the scientific question, it is very true that Dr. Sternberg worked some fifteen or twenty days in June last year in the laboratory of Dr. Freire during his absence, by the authority of the director of the medical faculty; it is true that I went there some eight or ten times to assist Dr. Sternberg, and to try and learn something from him, because I consider him to be an expert in bacteriology; but it is false that either I or the American physician searched Dr. Freire's closets and lock-ups, and that we took advantage of his (Freire's) scientific processes to find out his secrets. As I have heretofore stated the only "culture" examined by us was furnished by Dr. Caminhoá Filho. Now, I wish to affirm that the only "lock-up" opened by order of Conselheiro Baron de Saboia was that which contained microscope slides, aniline colors, tubes, etc., the "lock-ups" with rotten cultures remaining locked, and we neither saw nor asked for the keys. I defy Dr. Freire to prove the contrary.

In this (following) point Dr. Freire spoke the truth. He himself confessed that all the these existing cultures were deteriorated, and in such cultures it is not possible to discover secrets, nor to find out scientific processes, *which could not be mysterious, as he himself described them in his publications.* Consequently, Dr. Freire, besides not speaking the truth, argued with his usual bad faith.

That which Dr. Freire hides, with the perfidy of a treacherous adversary, is that *Dr. Sternberg worked during the whole of July and ten days in August conjointly with Freire after his return from Europe; that he (Dr. Freire) fraudulently conceals that he himself showed Dr. Sternberg his "pure cultures," and performed himself his experiments and demonstrations in Dr. Sternberg's presence.* Note well that the American doctor was not idle, and in the absence of Dr. Freire he worked in the laboratory of the medical faculty, which belongs to the State, and where any one can work by permission of the authorities, and that as soon as Dr. Freire returned, they worked together. Now, I ask what is the motive of Dr. Freire, with such cunning in hiding this important fact, that is, *that he himself demonstrated his processes to Dr. Sternberg during thirty days in July and ten in August?* Because he wished to have it believed that the report of the illustrious American doctor was based *solely* on the examination of a deteriorated culture furnished spontaneously by his assistant, Dr. Caminhoá Filho.

This is false as false can be. Dr. Sternberg refers to the examination of a bad culture, but to draw his conclusions, contrary to Dr. Freire's wishes, he only used the demonstrations and experiments made in his presence by Dr. Freire himself after his return from Europe. Fixing myself on this point which can not be refuted, and can easily be proved by reading the report of the illustrious American physician, I ask who has given proofs of the want of scientific honesty and the want of morality.

Let the reader's good sense reply.

Dr. Freire accused me of having violated his laboratory. I have shown that I was there only with Dr. Sternberg, by order of the director of the faculty. He does not reply to this; hence I consider that he can not, and that he spoke falsely. He accused me of having violated his closets and furnishing Dr. Sternberg with deteriorated cultures. I have proved that the closets were locked, and that nobody touched them, and that the only culture examined was given by Dr. Caminhoá Filho. He did not reply to this; hence his accusation was considered false. What more is there in the two speeches of Dr. Freire in the medical congress? Trivialities and insults!

To conclude, two words as to the president of that congress: The Conselheiro president permitted Dr. Freire to insult me twice with impunity; the first time without notice, the second time his reprehension was so slight as to be entirely without effect. Consequently, I do not think I should again present myself at the meetings of the congress. I do not wish to be a passive victim of fresh insults.

ARAÚJO GÓES.

Rio, 18th September, 1888.

Finally, Dr. Freire criticises my action in not making known the conclusions which I had reached as the result of my investigations while in Brazil, and in not attending the International Medical Congress in Washington for the purpose of publicly discussing the paper which I knew he was to read with reference to his preventive inoculations. There were several reasons for this action—first, my investigations were not completed, as my orders required me to go to Mexico and investigate the claims of Dr. Carmona y Valle, before making my report; second, I had no time to spare for the Washington meeting, as I was distinctly instructed to complete my investigations by the 1st of October; third, at the same time that I received my orders the following letter was placed in my hands, which I construed as meaning not only that I was required not to allow the publication of my instructions, but that I was expected to

refrain from publishing the results of my investigations until my report had been submitted to the President. Accordingly I refrained from making any publication, even in my address as President of the American Public Health Association at Memphis in November, 1887; and before making the summary statement in my address before the College of Physicians of Philadelphia in April, 1889, I called upon the President and obtained his permission to make public the results of my investigations in Brazil and in Mexico.

[Copy.]

TREASURY DEPARTMENT,
Washington, D. C., April 30, 1887.

DEAR SIR: It is the desire of the President that the inclosed instructions be not given to the press for publication until the report of Dr. Sternberg is made.

Yours, respectfully,

HUGH S. THOMPSON.

Supervising Surgeon-General JOHN B. HAMILTON, *Washington, D. C.*

Copy furnished for the information of Surgeon Sternberg.

APPENDIX.

As a matter of historical interest in connection with the subject of protective inoculations against yellow fever, I introduce here an account of the inoculations made in 1854 and 1855 by Dr. William Lambert de Humboldt, and those made in 1864 by Drs. Lebrede and Cisneros, of Havana.

Dr. de Humboldt claimed to be a nephew of the celebrated Alexander v. Humboldt. He asserted that he had discovered a sure means of protecting from yellow fever by inoculations with the venom of a poisonous snake, found in Mexico, but kept as a secret the precise species of snake from which his material for inoculations was obtained. His theory was based upon the fact that symptoms somewhat resembling those of yellow fever are produced by the venom of certain poisonous snakes. These symptoms are hemorrhage from the gums, slow pulse, fever, etc. The first experiments of Humboldt were made in Vera Cruz in 1847, by authority of the government, upon condemned prisoners. According to Boudin the matter inoculated was an ounce of sheep's liver which had been bitten by six of these poisonous serpents. This was left to undergo putrefaction before it was used for the inoculations.

A history of Humboldt's inoculations has been written by Dr. Nicolas B. L. Manzini. This is a volume of 240 pages, which was published in Paris in 1858. We shall quote from this work, which is entitled: "*Histoire de l'inoculation préservative de la fièvre jaune, pratiquée par ordre du gouvernement espagnol, à l'hôpital militaire de la Havane.*" Rédigée par Nicolas B. L. Manzini, docteur en médecine de la Faculté de Paris, membre titulaire de la Société médicale d'émulation de Paris, médecin de l'Association de bienfaisance française de la Havane.

PREFACE.

However small the importance of our work may be it has cost us nevertheless two years of labor: the first, consecrated to making the inoculations, to taking notes, and treating the patients inoculated; the second, to writing it. * * * At the moment of printing it we ought to say that the only motive which has decided us to do so is to show that, contrary to the judgment of Dr. Bastarreche in his official report to the Spanish Government, the inoculations gave a good result during the year 1855, the first year of the experiment. The result of the years 1856 and 1857 is unknown to us; we await, in order to discuss it, a publication of the facts. Let it not be supposed from what we have said that we consider the inoculations to have been demonstrated to protect from yellow fever. We believe, on the contrary, that a question so complex could not be settled in a few months. * * * The hasty proscription of the inoculation, when 2,477 persons inoculated had only been followed by 67 deaths from yellow fever in the course of a year in place of 25 per cent of the number, which is the mean proportion of the mortality among troops arriving from Europe during the first year of their residence on this island; this proscription, we say, can prove nothing else than that the judgment had fallen upon persons who had not all the qualifications necessary to acquit themselves of this mission.

The circumstances which placed us in a position to write this history will appear in the proper place. * * * The delicate health of M. de Humboldt permitted us to practice nearly two thousand of the inoculations made and to treat nearly all of the fevers and other maladies of the inoculated, a care which M. de Humboldt very willingly intrusted to us. * * *

Since the end of the year 1855 there has been no further question of inoculation, and M. de Humboldt himself left Havana early in November 1856, having seen his discovery judged in a military way by a tribunal composed of a single individual and

executed with the precipitation of a state of siege. Finally the journals of Mexico, of the month of February, 1857, announced his death in Vera Cruz.

We do not inherit his secret, and we are ignorant whether or no he has left it to any one. * * * Let us not disturb the repose of the dead! And above all it is not for us to tear off his shroud for the purpose of ascertaining whether there was in him something other than the man of science. Certainly he had a rare intelligence, and was a person gifted with an extraordinary imagination, although his medical education was incontestably incomplete.

I take occasion in this preface to protest before the world of science against the reports which have been made with reference to the inoculations without knowledge of the facts. * * * There were only two individuals in a position to judge of them properly, M. Bastarache and myself—M. Bastarache by the official position which he occupied, and I by that which M. de Humboldt made for me.

CHAPTER I.

I. In the month of October, 1854, Dr. William Lambert de Humboldt, residing then in New Orleans, wrote to Gen. don José de la Concha, governor of the Island of Cuba, announcing to him that he had discovered a substance, the active principle of which was the venom of an ophidian, which substance, inoculated by vaccination in persons who were strangers in the localities where yellow fever reigned as an epidemic, protected them from this terrible malady. M. de Humboldt said that during a period of nine years he had inoculated fourteen hundred and fifty-eight individuals. Of those whose history he had been able to follow he had only seen seven attacked with yellow fever, and of these only two had died. Out of three hundred and eighty-six inoculated in New Orleans he had not in any case seen yellow fever characterized by the pathognomonic symptoms—black vomit, etc. Finally, M. de Humboldt offered to apply his preservative to the Spanish troops of the Island of Cuba, in a most disinterested manner.

II. General Concha first consulted Dr. Basterreche, chief of the corps of military sanitation of the Island of Cuba, with reference to this important affair, who considered it prudent to consult with some of his medical friends, who all gave a favorable opinion. Then General Concha, who at the outset took a lively interest in the question, consulted, officially, the University, submitting at the same time a *mémoire* by M. de Humboldt relative to it. This corporation judged that the experiment was admissible and that the facts would decide the question. In consequence of this decision M. de Humboldt was invited to come to Havana. A ward in the military hospital was placed under his absolute direction. It was likewise agreed that all of the inoculated who should subsequently fall sick should be placed in his care, and that he could be assisted or replaced by persons of his selection. A commission of the University was named to follow the march of the operations and to make exact observations. It was composed of Drs. Cowley, Castroverde, and Benjmeda.

III. M. de Humboldt had scarcely arrived in Havana when I put myself in relations with him. He appears to be thirty-five to thirty-six years old. He is blonde, high and slender. His chest, flattened in front, offers the conformation peculiar to the tuberculous. * * * Although his health is precarious he is endowed with a feverish activity and with a resistance to work which is surprising. M. de Humboldt speaks four languages, among them the Spanish and French as perfectly as is possible for a foreigner. German is his native tongue and he speaks, besides, English. * * *

The special history of the phenomena of the inoculation which we are about to write is derived from seventy-nine observations collected and written out by M. de Humboldt and myself. Besides, we have drawn some information relative to the circulation and headache from one hundred and thirteen other cases, collected in the military hospital under the direction of M. de Humboldt.

We have little to say of the character of the substance inoculated, which has precisely the appearance and the odor of the liquid residue of animal putrefaction.

§1. *Local phenomena of the inoculation.*

As soon as the inoculation is made, a crossed bandage is applied to the puncture and no further attention is paid to it. If it is examined at the end of a few moments it will be found to be surrounded with an elevation in the form of a white papule, diaphanous, and quite analogous to that produced by the puncture of a bed-bug. This phenomenon was visible at the end of five minutes or even of three. It was no longer seen at the end of twenty-four hours, of twelve, or even of ten. A sensation of tingling and numbness, a veritable phenomenon of slight anesthesia, soon manifested itself in the fore-arm and lasted for a variable time; we have seen it persist until the fourth day in the case of Madame Mercedes Parodi. We have never seen any swelling of the axillary glands.

§2. *Outline of the sickness induced.*

Syncope may occur at the moment of inoculation, this soon passes; or a nervous trembling, which is more rare but which lasts longer. The pulse is accelerated under the influence of the emotion of the moment. At the end of seven hours (all of the times which follow are the mean time deduced from the extremes) the pulse is modified in a permanent manner; it is more frequent or slower, stronger or more feeble. At the end of eleven hours there is febrile heat; at the end of fourteen, headache, thirst, loss of appetite; at the end of sixteen the face is red, the conjunctivæ injected, lachrymation. A commencement of swelling of the gums is observed and slight colicky pains are experienced, produced by the medicine which the patient commenced to take immediately after the inoculation.

First. At the end of eighteen hours pain in the gums, which commence to be colored around the borders of the teeth; pain in the salivary glands and in the direction of the different nervous branches of the face and cranium. Second. Of nineteen hours, pains in the lower jaw in the direction of the inferior maxillary nerve, lassitude; of twenty hours, bitter taste, somnolence, œdema of the face; of twenty-two hours, feeling of constriction of the throat, without visible modification of the mucous membrane; of twenty-five hours, yellowness of the skin; of twenty-four hours, hemorrhage from the gums; of twenty-eight hours, eyes yellow, chills; of twenty-nine hours, inflammation of tonsils; of thirty hours, pain in region of kidneys; of thirty-six hours, œdema of eyelids; of thirty-eight hours, muscular and articular pains; of forty hours, toothache; of seventy-two hours, œdema of the lower lip; at different times, erotic phenomena. During convalescence, cutaneous itching; cutaneous eruptions of different kinds.

§3. *Immediate treatment.*

As soon as the inoculation was made we administered a sirup composed as follows:

R. Sirop. de mikania guaco.....	187 gr.
Sirop. of rhubarbe	125 gr.
Iodure de potassium.....	4 gr.
Gomme gutte	12 gr.
D. et M.	

This sirup was administered in the following manner: First day, a tablespoonful every two hours; second day, one every four hours; third day, one morning and evening. If the symptoms are more violent, the interval is shortened; and if that is not sufficient, it is necessary to add to the sirup an infusion of mikania,* a teacupful every two hours.

We shall not attempt to follow our author in his account of the symptoms produced by the poisons of various venomous snakes and in his attempt to show a resemblance between these symptoms and those of yellow fever. Nor shall we quote his account of the results of the inoculations made, inasmuch as we have these from an official source in the report of Dr. Bastarreche, which, with great fairness, Dr. Manzini has included in his volume, although he insists, contrary to the opinion and figures of Dr. Bastarreche, that the inoculations were attended with a comparatively favorable result.

EXTRACTS FROM THE OFFICIAL REPORT OF DR. M. BASTARRECHE, CHIEF OF THE CORPS OF MILITARY HYGIENE OF THE ISLAND OF CUBA.

The inoculations commenced the 18th of December among individuals who voluntarily presented the selves, the first having been Lient. Col. M. Firmin Pujols, commandant of the engineers; after him some physicians of the army, other officers, and six soldiers, who, after the operation, which consisted in the introduction of the virus by means of a lancet, were subjected to the regimen indicated by Dr. Humboldt. This regimen consists in a moderate diet and in taking every two hours the sirup which had been prepared for this purpose: Sirup of a decoction of guaco, 350 grams; sirup of rhubarb, 225 grams; iodide of potassium, 4 grams, with the addition of 60 centigrams of gamboge dissolved in 16 grams of water. Of this sirup, which he ad-

* *Guaco*, or *huaco*.—Name in South America of several plants regarded as efficacious against the bites of venomous snakes. * * * (*Mikania guaco*, Humb. and Bonpland.) The juice from the interior is taken and applied to the wounds. The powder of guaco, which is also employed, has the appearance of that of digitalis and the odor of *semen-contra* (Diet. of Nysten.).

ministered in doses of a teaspoonful, the patient took during the forty-eight hours as much as 500 grams, according to the symptoms which he presented.

In order that the observations might be made with the greatest impartiality and exactness, I detailed for this work a physician of the military service, M. Benoit Lozada y Astray, who established himself in the hospital, where he remained constantly, day and night, occupied continually with this difficult labor. * * * Since the day indicated new individuals were inoculated daily; experience having demonstrated that those who submitted to the operation were not exposed to any harm, the number augmented, and the commanding general of the navy, as well as the director of the congregation of Saint Vincent de Paul asked to have the sailors and the sisters of charity inoculated. The political events of February made it necessary to suspend the inoculations in consequence of the continual movements of troops and ships; they were again resumed, and finally suspended definitively when cholera invaded the military hospital, the accumulation of individuals being the most efficacious means of developing an epidemic, and especially in the military hospital, where so many elements are united favorable for such development, as has been observed on various occasions. The symptoms experienced by those inoculated varied in different cases. In many no noticeable result was seen; in others we observed slight chills and a temporary feeling of malaise; in other cases there was lassitude; others experienced pains in the joints; some pains in the back; and finally in some one observed in addition redness of the conjunctivæ, slowness of the pulse, swelling of the upper gums, and in a few rare cases a slight hemorrhage from the gums occurred. These symptoms commonly lasted for three or four days, and disappeared with the alvine discharges produced by the sirup, leaving the patient in a perfect state of health; no fatal accident occurred, although two thousand four hundred and seventy-seven individuals were inoculated in the military hospital. The physicians who composed the commission of the university having demanded from M. de Humboldt that he should give the sirup to some individuals who had not been subjected to the operation, in order to see whether the medicine did not contribute to the development of the symptoms presented by the patients, Dr. Humboldt opposed the proposition, and we were obliged to give up the experiment as well as the proposition to inoculate some animals, which was not accepted. Later Dr. de Humboldt demanded and obtained from the government permission to establish a place for the inoculation of the civil population who might wish to be inoculated, and as he received in such cases a pecuniary remuneration many persons commenced from this time to look upon him with suspicion; and, indeed, it was not without reason, for if the inoculation was a verity Dr. Humboldt would have been amply recompensed without having to employ any means to secure a reward.

When once a polemical discussion had been entered upon in the journals, several physicians, and some persons not belonging to the profession, joined in it. Disgusted with this, Dr. Humboldt demanded that the government should suspend the inoculations, a measure which was not adopted, for what was desired was to inoculate as large a number as possible, as a means of securing a prompt and decisive result.

* * *

If we compare the number of individuals who entered the military hospital of Havana, attacked by yellow fever, in each of the months of the year 1854, with those of 1855 (see table No. 1) we observe that, as to the first months of summer, there were many less in the latter than in the former year, and even in the months of August, September, and October we see a great difference; that is to say, there were fewer cases in 1855; whether this was the effect of chance, or because the winter had been long and fresh, the fact is that until the time mentioned it seemed that the year was a favorable one in this respect, and for this reason those inoculated were attacked in small numbers. There was, therefore, no reason yet for drawing conclusions favorable or opposed to the solution of the question. But after the end of October, the season having been excessively warm, not only did yellow fever continue to prevail, but the number attacked was superior to that in 1854, and its intensity arrived at such a degree that the proportion of deaths to the number attacked was excessive. For this reason the commandant of the naval forces, in view of the great number of deaths, ordered that his sick, instead of being treated in the military hospital, should be taken to the *Maisons de Santé*, established in the port, upon the sea-board. In the communication which Dr. Humboldt sent to your excellency [the governor of the island to whom this report was made], dated October 27, was included a statistical statement, which showed that up to that time but nineteen of the inoculated had died of yellow fever; but in the twenty-five days during which I delayed sending information to your excellency, in order to collect the facts with reference to this point, twenty-five of them died, which added to nineteen gives forty-four; from which it will be seen that the mortality was greater during this short period than during the entire summer. Attached to this report I submit to your excellency tables of the results, which show the number of cases of *vomito*, or yellow fever, which have

occurred in the army and in the navy. These tables have been made from all of those received from all of the military hospitals of the island, drawn up by the physicians of the army and by those of the navy (see tables 2, 3, and 4). In these tables the number of individuals is indicated who have had the disease in each of the hospitals of the island and in that of Havana, the corps to which they belong, the ship upon which they had embarked as sailors, as well as the mortality and the ratio per cent. The number of inoculated who have had the fever, and the number of deaths is also given. These facts prove clearly that no advantageous result has been obtained by inoculations of the virus proposed by Dr. Humboldt, but it is not less true that up to the present time no evil results have followed its application. May it not be that this inoculation, without preserving from the *rombo*, diminishes the probability of a fatal result in those attacked? In order to arrive at an exact judgment upon this question, it would be necessary to know what proportion the non-inoculated in the army bear to the two thousand four hundred and seventy-seven inoculated. But, independently of the fact that this is absolutely impossible, for it would be necessary to deduct those who have already been attacked, we can not start from this point since we must not include those who, by reason of long residence on the island may be considered acclimated and consequently can not enter into the comparison. Besides the different localities occupied by the troops necessarily influences the number of those attacked by the malady, for, as your excellency knows, there are localities where this cruel scourge augments considerably and others where it is scarcely known. Thus one can say nothing with regard to the difference between the number one thousand three hundred and nine attacked among the non-inoculated and two hundred and twenty-eight among the inoculated. Nor can we attach any importance to the greater mortality among the latter, which amounts to 29.39 per cent., while that of the first group is only 22.29 per cent. (see table No. 5). This difference may depend upon accidental circumstances, such, for example, as the greater or less salubrity of the localities of the hospitals where individuals of one or the other group have passed through the malady. The only fact worthy of attention is that which results from a comparison between the number inoculated and the number attacked with yellow fever, and between the latter and the number of deaths. The number inoculated was two thousand four hundred and seventy-seven, and the number attacked two hundred and twenty-eight, a proportion of 9.25 per cent. of the latter to the former number, while the ratio of deaths to those attacked is 2.70 per cent. If this number does not augment considerably in the following years, and if we had a point of departure for comparison with what happens in another group of soldiers not inoculated, we could yet, as a final observation, see if, considered in this way, the inoculations offer any appreciable value. This observation can be made by reason of the arrangement adopted by your excellency for examining the losses which have occurred during the past five years in the regiments of the king, of the queen, of Saragossa, and of Baylen, which, being new organizations, came to this island in 1851. And it will be proper in every way to keep an exact account of the losses which may occur among the inoculated, as your excellency has directed. This is all I have to say to your excellency relating to a question so interesting and most important for the soldiers, for humanity, and for science in general.

May God preserve your excellency for many years.

FERDINAND BASTARRECHE.

To His Excellency the Captain-General of the Island of Cuba.

HAVANA, January 25, 1856.

It will be sufficient to introduce here a single one of the tables appended to the report of Dr. Bastarrecche.

COMPARATIVE SUMMARY.

Table No. V.

	Not inoculated.			Inoculated.			Ratio of mortality.
	Attacked.	Died.	Ratio.	Number.	Attacked.	Died.	
Army.....	1,045	254	24.31	1,214	84	21	25.00
Navy.....	264	47	17.80	1,263	144	46	31.94
Total.....	1,309	301	22.99	2,477	228	67	29.39

Nothing further has been heard of Dr. Humboldt's method of inoculation in Havana, and the inference is that by common consent the experiment made on so large a scale and under such favorable conditions is regarded as having demonstrated its inutility.

A more recent attempt to protect from yellow fever by inoculation is that made in 1864 by two physicians of Havana, members of the Academy of Sciences, and recorded in the "Anales" of the Academy. We quote the translation which Dr. Stanford E. Chaillé, president of the Havana Yellow Fever Commission of the National Board of Health, has introduced into his elaborate and valuable report: *

In June, 1864, Drs. Lebrede and Cisneros, members of the academy, and distinguished physicians, tested the prophylactic value of inoculated dew, by request of Drs. Masnata and Fraschieri, who had claimed for it protective power.

The substance used was not, as had been generally supposed, natural dew, but an artificial dew obtained by the condensation of vapor of the atmosphere of the closed room of a yellow fever patient, and collected on the surface of bottles containing water of a lower temperature than that of the surrounding air. After prolonged examination the following were our conclusions:

Yellow fever is not a contagious nor an inoculable disease, hence the inoculation of dew can not be effective. There is no such entity as the so-called "fever of acclimation," and it has not been proved that the ailments thus designated protect from yellow fever. The symptoms following the inoculation of "rocio" lack the uniformity necessary to constitute a classifiable pathological condition as dependent solely on the inoculation; the very slight intensity of the phenomena discredit their identity with those of the so-called "fever of acclimation;" in many instances no phenomena have ensued, and all the results obtained are explicable by disregard of hygienic laws. In three counter-experiments distilled water was inoculated. In one case more remarkable results ensued than in any case inoculated with "rocio;" in a second the results were as mild, and in a third case no results at all ensued. Finally, as the result of experiments, the inoculation of "rocio" is ineffective, and equally as negative as inoculations of black and of bilious vomit.

* Annual Report of the National Board of Health for 1880, p. 166.

SELECTED CASES FROM HOSPITAL PRACTICE.

COLLECTIVE INVESTIGATION OF THE SYMPTOMATOLOGY OF ENTERIC AND REMITTENT FEVERS.

The following circular was issued :

[Circular.]

RECORD AND CLASSIFICATION OF CONTINUED AND REMITTENT FEVERS.

1888. Department No. 65.]

TREASURY DEPARTMENT,

OFFICE SUPERVISING SURGEON-GENERAL, MARINE-HOSPITAL SERVICE,

Washington D. C., June 7, 1888.

To Medical Officers and Acting Assistant Surgeons :

With a view of formulating a more precise symptomatology of the "continued" and "remittent" fevers, from and after July 1, 1888, you are directed to take full and accurate notes of all cases of "continued" and "remittent" fevers treated by you among patients of the Marine-Hospital Service, and to make special semi-annual reports of all such cases to this office.

The cases of fever should be classified, as far as practicable, according to the symptoms in each case, into simple continued, enteric, remittent, etc., and every symptom noted.

The presence or absence of the following symptoms relative to enteric fever should be carefully noted, together with the dates of their respective appearance :

Eruption.

Diarrhœa.

Tympanites.

Intestinal hemorrhage.

Perforation of intestines.

Peritonitis.

Temperature range.

Enlargement of spleen.

Delirium (character).

Mode of onset (gradual or sudden); presence or absence of initial chill.

Necropsy.

Presence or absence of intestinal lesions, and, if present, give exact location.

JOHN B. HAMILTON,

Supervising Surgeon-General.

Approved :

C. S. FAIRCHILD,

Secretary.

Up to the 30th of June, 1889, the reports received include 122 cases of enteric fever and 46 cases of remittent fever.

ENTERIC GROUP.—122 CASES.

Eruption.—There was no eruption in 25 cases, the earliest date was the fourth day, and the latest the twenty-first day; it appeared on the fifth day in 2 cases; on the sixth day, in 3 cases; on the seventh day, in 5 cases; on the eighth day, in 6 cases; on the ninth day, in 3 cases; on the tenth day, in 11 cases; on the eleventh day, in 11 cases; on the twelfth day, in 8 cases; on the thirteenth day, in 2 cases; on the four-

teenth day, in 5 cases; on the fifteenth day, in 1 case; on the sixteenth day in 1 case; on the seventeenth day, in 1 case; on the eighteenth day, in 3 cases; on the nineteenth day, in 1 case; on the twenty-first day, in 2 cases; the date was not given in 31 cases.

Diarrhœa.—This symptom was absent in 26 cases; there was constipation in 3 cases; in 66 cases the date of the appearance of diarrhœa is given, as 1 on the second day; 2 on the third day; 3 on the fourth day; 5 on the fifth day; 7 on the sixth day; 5 on the seventh day; 5 on the eighth day; 2 on the ninth day; 6 on the tenth day; 3 on the eleventh day; 3 on the twelfth day; 2 on the thirteenth day; 8 on the fourteenth day; 3 on the fifteenth day; 1 on the sixteenth day; 1 on the seventeenth day; 1 on the eighteenth day; and 1 on the twentieth day.

Intestinal hemorrhage.—This symptom was present in 8 cases, absent in 114 cases.

Tympanitis.—This symptom was present in 69 cases, absent in 53 cases.

Temperature.—The highest temperature recorded was 41°·2, the lowest was 36°.

Spleen.—This organ was enlarged in 54 cases, and apparently normal in 67 cases.

Delirium.—This symptom was present in 26 cases.

Mode of onset.—The onset of the disease was gradual in 111 cases, and sudden in 11 cases.

Intestinal lesions.—In the 11 fatal cases there was ulceration of Peyer's glands in 5 cases; peritonitis in 2 cases; no intestinal lesions in 4 cases. (The necropsies are elsewhere recorded in this volume.)

The reporters were Surgeons Bailhache, Wyman, Long, Sawtelle, Anstin, Stoner, Goldsborough, and Irwin; Passed Assistant Surgeons Wheeler, Carmichael, Devan, and Bratton; Acting Assistant Surgeons Allen, Case, and Foster.

REMITTENT GROUP—46 CASES.

Eruption, none; diarrhœa, 1 case; intestinal hemorrhage, none; tympanitis, 2 cases; highest recorded temperature, 41°·2; lowest, 36°; enlargement of the spleen occurred in 9 cases; slight delirium, in 2 cases; mode of onset sudden in 9 cases; gradual in 37 cases; death occurred in 1 case, in which there were no intestinal lesions.

ABSCESS OF LIVER—ASPIRATION—RECOVERY.

By Surgeon HENRY W. SAWTELLE, *Marine Hospital Service.*

B. M., a strong, robust man, was admitted to the U. S. Marine Hospital, San Francisco, Cal., November 26, 1888, with the following history: About seven years ago he was treated for chills and fever, after which he enjoyed fair health up to about twenty days previous to date of admission. He was then attacked with a severe chill, followed by acute pain in the hepatic region, the pain continuing two days. After this, he had profuse perspiration for twelve hours. He was under the care of a private physician for fifteen days; during this period the feet were œdematous. When admitted to this hospital, November 26, the liver was greatly enlarged, swelling out at lower part of chest; some fever, with night-sweats; no nausea.

November 27.—Liver aspirated just below costal arch, some 6 centimeters to right of median line; large needle passed in about 4 centimeters, in direction backward, slightly upward and outward, evacuating 250 cubic centimeters rather dark odorless pus. Thereafter temperature ranged mostly from $37^{\circ}.2$ to $37^{\circ}.6$ or less and he was comfortable, with slight pain over aspirated region at times. Patient apparently improved during December. At the end of the month, with rise of temperature, other symptoms caused an examination with view to further operation. It was decided to explore a globular elastic swelling, which had been noted at the first aspiration, just below the point where the needle was then entered. This elastic or fluctuating swelling seemed then probably a hypertrophied portion of lower edge of right lobe.

January 2, 1889.—Pus was demonstrated in this swelling, and under chloroform it was freely incised with aseptic precautions, some 100 cubic centimeters pus, somewhat offensive, evacuated, the forefinger introduced and all septa broken up, and the extent of abscess cavity ascertained. This was found to reach downward and inward, occupying the anterior border of liver to its very edge, all firmly adherent to abdominal wall. A large drainage tube was introduced, the cavity washed clean with (1 to 3,000) sublimate solution, and a large dressing of bichloride cheesecloth in many folds held over it with a bandage. Thereafter the temperature sank almost immediately, and the secretion of pus became almost nil. Next day temperature normal.

January 15, 1889.—Temperature continues normal; patient comfortable and feeling better every day; drainage tube has been shortened from time to time; cavity appears to be contracting, with insignificant discharge of shreddy pus.

Discharged, recovered, February 16, 1889.

NOTE.—*March 29, 1889.*—I learned to-day that Morais returned to duty, in command of a trading schooner, upon leaving the hospital, and that his health continues good.

ABSCESS OF LUNG AND EMPYEMA SUCCESSFULLY TREATED BY INCISION, DRAINAGE, AND IRRIGATION WITH BICHLORIDE OF MERCURY SOLUTION.

By Surgeon H. W. AUSTIN, *Marine Hospital Service.*

L. A., aged, twenty-one years; nativity Illinois, was admitted to the U. S. Marine Hospital, Chicago, Ill., August 30, 1888, for empyema of the left pleura.

History.—Patient, man of medium stature, gives a history of having always been in robust health until November, 1887, when he was exposed in a severe storm at sea, resulting in a cough which has continued to the present time. He sailed from May 26 to August 6, when he noticed that there was some bulging of left side of the chest. He was examined by a physician in the city, who aspirated the left pleura several times during July and August, withdrawing 500 to 1,000 cubic centimeter clear fluid each time. When he presented himself at the hospital he was suffering from dyspnœa, chills, followed by high fever and night-sweats. His skin was white and of a waxy appearance, body considerably emaciated, and he was greatly debilitated. There was great bulging of the left chest wall; the apex heart sound was heard on the right side of the sternum and the left chest flat on percussion from base to apex.

An attempt was made to remove the fluid with an aspirator, but with little success, as the pus would not flow through the tube to any extent. The patient was then placed upon the table in dorsal decubitus, preparatory to the administration of ether before the operation of opening the chest, when a gush of purulent fluid burst from his mouth and nose and continued to flow in such quantity that he was nearly asphyxiated for a few minutes. After this the bulging of the side was somewhat diminished and his respiration improved. As he could not lie down it was thought best to operate without an anæsthetic, and an incision about $1\frac{1}{2}$ inches long was made in the axillary line between the ninth and tenth ribs, and a loop of rubber drainage tube of one-half inch caliber inserted and fixed with rubber plaster. About 5 quarts of offensive smelling purulent fluid passed through the tube in a few minutes. The sac was then washed by injecting 3,000 cubic centimeters (3 quarts) of warm bichloride solution, 1 part to 4,000, by means of a fountain syringe. The fluid passed out as soon as the nozzle of the syringe was removed. A large pad of oakum (made aseptic by immersion in hot bichloride solution) was then applied with a bandage and the patient put to bed and made to lie upon his left side. Medication was brandy, quinine, and iron. The pleural sac was washed out in the same manner morning and evening, and a similar dressing applied each time. Considerable quantity of pus was removed with each dressing, but this diminished from day to day; his temperature gradually came down to normal and his appetite and strength returned. A few days after the operation a large cavity was discovered in the upper lobe of the left lung, which I believe communicated with the bronchial tubes, and also with the pleural cavity. While in the act of coughing the air would pass out through the wound in the side, making a peculiar amphoric sound, followed by a long whistle.

October 1.—About one month after the operation there was but a slight purulent discharge from the wound ; the left side of the chest was much smaller than the right and the left lung partially consolidated.

December 1.—A small sinus still remained in the wall of the chest, from which a little viscid mucus passed, but no pus. All attempts to close this sinus proved unsuccessful. It was treated with astringent injections, and cauterized with silver nitrate, iodine, etc. The patient regained his usual health and strength, and was permitted to go when he pleased upon the hospital grounds.

January 27, 1889.—He declared his intention of going to sea and asked to be discharged, which was refused ; he therefore deserted and was recorded "improved" in the hospital records.

REPORT OF OPERATION FOR THE RADICAL CURE OF HERNIA.

By Surgeon H. W. AUSTIN, *Marine Hospital Service.*

J. J.; aged forty-three years; nativity, Sweden; was admitted to U. S. Marine Hospital, Chicago, Ill., December 17, 1888, for right inguinal hernia, the result of severe muscular exercise in lifting an iron bar above his head, occurring in August, 1888. The hernia was about the size of an English walnut, and did not pass into the scrotum, but he suffered considerable pain on account of it, and requested an operation for its cure. The patient's general condition was somewhat below normal at the date of his admission to the hospital, and the operation was postponed until January 4, 1889. The pubes were shaved and the parts above the hernia washed with bichloride solution and ether administered. The canal was exposed by an incision about $2\frac{1}{2}$ inches long; the sac dissected from the cord, twisted and returned to the abdomen. The ring was firmly stitched with catgut sutures; the external wound closed with silk after inserting braided catgut for drainage. A firm pad of bichloride gauze and borated cotton applied with a bandage and the patient was put to bed. The first dressing removed January 10; January 11, wound completely closed and all the sutures removed. Patient kept in hospital under observation one month after date of operation; there being no re-appearance of the hernia he was discharged cured.

THE RADICAL CURE OF HERNIA BY THE M'BURNEY METHOD.

By Passed Assistant Surgeon S. T. ARMSTRONG.

There is probably no occupation that demands of its laborers a more perfect physique than that of the sailor. At any time, in the exercise of his vocation, he may be called upon to make prolonged and severe physical exertion, and an organic weakness may entail not only disaster to himself but to others that have been intrusted to his care. In recognition of this fact, the reports of this service have annually asked for the enactment of a law requiring that all sailors pass a physical examination before shipping; but, in the absence of any statute, as the conservator of the hygiene of the mercantile marine and of the seamen, it is our obligation to assist every seaman by curing any disability in order that he may follow his vocation. Such a disability is hernia; can it be cured?

In the annual reports of this Service we find the following statistics regarding hernia, and while the lesion in the majority of these cases may have originated in line of duty, yet a moderate percentage, at least, is probably of congenital herniæ. A preliminary physical examination would have interdicted this latter class from shipping; but are we doing the best that can possibly be done for either class when we apply a truss and send them back to their vessels?

In a paper on the "Radical Cure of Inguinal Hernia, etc.,"* Surgeon-General John B. Hamilton says: "I favor in all cases affording even a reasonable prospect of cure an operation therefor, and that all cases whatsoever of bubonocoele should be operated upon."

Year.	Total number of patients treated.	Cases of hernia treated.		Number cases operated on.	Deaths.
		In office.	In hospital.		
1880	24,860	159	23	-----	-----
1881	32,613	184	23	5	-----
1882	36,184	217	25	5	1
1883	40,195	308	40	8	2
1884	44,761	364	35	9	5
1885	41,714	367	29	9	1
1886	43,822	417	27	7	3
1887	45,314	445	27	14	4
1888	48,203	522	47	16	3

The table enables us to see that the number of cases of hernia treated annually has increased, that the number of cases operated on is yet extremely small, and that there is a large number of men at present employed in the merchant marine that are physically disqualified. Nothing can be deduced from the deaths, because in nearly every

* Journal of the American Medical Association, September 4, 1886.

instance these occurred in cases of strangulated hernia. The excellent results of Surgeon Long (annual reports 1837, 1838) demonstrate the safety of operative measures.

The methods of operating have been various, including the Heaton, Czerney, and Wood operations.

I desire to present for consideration an operation that seems to answer all of the requirements of an approximatively certain method of securing a radical cure. And by the latter phrase it is not meant that the patient "was discharged with no apparent hernia, and a *stout, well-fitting truss* applied to prevent recurrence," but that the patient is returned to his vocation without any artificial support over the inguinal region, able to undergo as much strain as any other normal man. The operation is, practically, one devised by Dr. Charles McBurney, of New York, though the principal features of his operation had been anticipated, as Dr. McBurney subsequently found, and credited by Otto Riesel.*

In order to explain the operations herein reported, I will quote extensively from Dr. McBurney's paper.† One of the most important features to successfully cure a hernia is the total ablation of the sac and the restoration of the peritoneum to its normal concavity. Any punching will be a departure from the continuous curvature of the peritoneum, a weakness of the adjacent arched fibers will exist; and as the stability of any arch will be interfered with by a weakness in a component curve, so this punching is a constantly increasing weakness in the peritoneum, eventually forming—or, if left after an operation, reforming—a hernial sac. Dr. McBurney calls attention to the fallacy of an operation for radical cure that ablates the sac at the external ring, leaving a pouch in the inguinal canal that will protrude beyond the ring within a short period, breaking down any cicatrix that may have been formed by suturing the pillars of the ring. Within a few months I have had such a case under my observation in which the above operation had been performed, the hernia returning within six months after the operation.

In McEwen's operation the sac is completely dissected out; then a suture is passed through the base of sac and brought out on the abdomen, and by tension on the suture the sac is invaginated, forming a "boss" at the internal ring and affording apparently additional protection against the re-occurrence of the sacculation of the peritoneum at that point. Theoretically this is an attractive operation; but a diseased sac or a small or thin sac would not permit the invagination, and in the discussion on Dr. McBurney's paper, Dr. Robert Abbe stated that in a post-mortem examination of a patient that he had performed McEwen's operation on the boss was not formed as was claimed, while a McBurney's operation on the opposite side had resulted in a smooth peritoneal surface.

Having disposed of the sac, Dr. McBurney pays attention to the canal. Virtually no canal is left, because in order to ligate the hernial sac at its neck it is necessary to slit up the anterior wall of the canal to the external margin of the internal ring. Instead of attempting to suture the incised wall of the canal, the skin, fascia, and conjoined tendon are separately sutured on each side, the intervening space packed in order to secure healing by granulation, and a dense cicatrix formed that supports the peritoneum. This is a renaissance of the goal of the ancient surgeons that sought to secure a firm cicatrix, even resorting to the actual canterbury to attain that end.

The details of the operation are as follows: The general condition of the patient is as usual for any operation, excepting in cases of strangulated hernia that do not permit of delay. The pubis, scrotum, perineum, and thighs are carefully shaved, the patient bathed, and within a few hours of the operation the lower portion of the abdomen is covered with a towel, wet with soft soap, retained in place by a bandage. The patient is anesthetized, preferably by chloroform, the towels and bandage removed from the

* Deutsche Med. Woch. 1877, pp. 449, 467.

† The Medical Record, March 23, 1889, p. 312.

abdomen and the skin cleansed by the soap, scrubbed with a bichloride of mercury solution (1 to 20,000). A free incision is made, "beginning a little outside the situation of the internal ring, and extending a sufficient distance downward over the sac." This incision is deepened until the anterior wall of the canal and the protruding sac are completely exposed; any bleeding vessels are caught in hæmostatic forceps. A grooved director is pushed gently under the external ring, and the wall of the canal incised to a point beyond the internal ring. The sac is now freed from the transversalis fascia and the spermatic cord, an incision being made in the former near the neck of the sac and the cord freed from above downward. The whole sac is dissected out and lifted up, and the wound and hands of the operator cleansed with a mercuric chloride solution (1 to 3,000). In congenital hernia it will be necessary to cut the sac away from the cord.

After a thorough irrigation of all the wound, the sac is incised at its fundus, and if intestines or a small mass of omentum are present they are reduced. If a large mass of omentum is present it is securely tied at a distance from its extremity, and the ligated portion cut off, the stump being returned to the abdomen. If any adhesions exist about the neck of the sac they are broken down by the finger. The sac being evacuated of any contents, the finger is introduced, passing beyond the internal ring into the abdominal cavity. Moderate tension is made upon the sac, and the assistant places a ligature about the neck of the sac, gently tightening it on the surgeon's finger; the latter is carefully withdrawn and the ligature tied. The sac is now cut off, a pedicle of sufficient length being left to prevent slipping of the ligature. In congenital herniæ the sac may be too large to ligate, it is therefore necessary to sew it smoothly; in one operation of this kind I considered it an advantage to commence with sutures at each end of the sac, permitting the presence of the finger within the peritoneum as it was sewn; the sutures being tied at the middle of the sac.

In the large wound that now remains, the floor of the external portion is formed by the peritoneum, of the internal portion by the transversalis fascia. Lying on this is the spermatic cord and vessels. The upper wall of the wound is formed by the conjoined tendons, the aponeurosis of the external oblique, the superficial fascia, and skin. The lower wall is formed by Poupart's ligament, the fascia, and skin. It is desired to secure granulation from the bottom of the wound to the surface, and it is necessary to bring down the conjoined tendon. From four to eight sterilized catgut sutures are introduced through the tissue composing the upper wall, the skin being carefully and deeply inverted as each suture is tied. The same process is followed in suturing the lower wall. This method insures the patency of the wound, making suppuration (if unfortunately it occurs) comparatively innocuous. Two heavy tension sutures are introduced through the skin above and below each wall, and are tied over pledgets of iodoform gauze. These secure further inversion of the skin, take off some of the strain on the sutures, and approximate the two walls.

The wound is again carefully irrigated and firmly packed with iodoform gauze in order to prevent an œdema of the tissues about the cord that would delay the granulation process. The scrotal or labial wound is sutured with catgut. The wound is covered with large pieces of iodoform gauze, and cotton is placed over it and bandages applied. Over the bandage, encircling the penis, a piece of rubber tissue is placed to prevent soiling of the dressing by urine. Dr. McBurney advises the use of a catheter for a few days, though in my operations I have not found it necessary; and in children he applies plaster of paris, or shellacs the dressing, to prevent urinary saturation. The patient is placed in bed, and in my cases I have the thighs partially flexed by pillows underneath in order to prevent any strain on the sutures. The dressing need not be changed for from six to ten days, unless there are indications for an earlier examination. The wound is redressed in the same manner, and a strong cicatrix, is generally formed in from five to six weeks.

Dr. McBurney claims for his operation, (1) that it is the only method in which the sac is completely obliterated; (2) that the walls of the canal are very firmly

united throughout the whole length by strong cicatricial tissue; (3) that the wound being open the risk of abscess and septic complications is reduced to a minimum; (4) that it is rapid and applicable to every form of inguinal hernia.

He has performed his operation on over forty cases, with only two deaths; each in men of middle age, accustomed to the free use of alcohol, in whom alcoholic delirium developed some days after the operation, followed by coma and death. *En passant* I would say that I think the alcohol is not the cause of the fatal issue, but the use of that dangerous anæsthetic ether for a period of always more than an hour. I have heard of one other case of death after this operation from a pneumonitis that was probably caused by ether.

Of course the operation is thoroughly aseptic. Boiling the instruments for half an hour before the operation, and covering all exposed portions of the body with boiled towels, the excellence of the iodoform gauze and cat-gut being assured, and the absolute cleanliness of the hands of the operator and each of his assistants being essential to an aseptic operation.

CASE I.

Left oblique congenital hernia.

A. N.; aged twenty-two years; a native of Sweden; was admitted to the hospital on February 16, 1889. He stated on admission that he had been beaten by the captain and mate of the vessel on which he was employed, and subsequent to this ill-usage he noticed a small inguinal hernia of the left side. As he was suffering from some contusions he was treated therefor, and a slight fever, probably malarial, developed on the 18th, for which he was given quinine and acetanilide. On the 25th, his general condition being good, he was operated on by the method detailed above. He was given a hypodermatic injection of morphine and atropine after the operation, and acetanilide, .33 gm., every two hours. Temperature in the evening 38° C., pulse 90.

February 26.—Complains of tenderness in the left rectus abdominalis muscle. Slight nausea, for which lime water and ice was ordered. Morning temperature, 37° 4 C.; afternoon temperature, 38° 5 C.

February 27.—Slept well during the night. Nausea continues; no appetite; no abdominal pain. Temperature, 38° C.

February 28.—Slight abdominal pain; ordered an injection of sulphate of soda, 20 gm. This acted efficiently and he felt much better. Temperature, 38°.

March 1.—No abdominal tenderness; general condition excellent.

March 4.—Dressed the wound; slight suppuration about the external surface of the wound; removed one retention suture.

March 6.—Stopped acetanilide, as the temperature has not exceeded 37° 4 C. since the first of the month.

March 8.—Patient complained of tenderness in the wound, so the dressing was changed. The drainage tube was removed from the scrotal incision, that portion of the wound having healed by first intention. The retention sutures had to be removed on account of slight suppuration along their track. There was no suppuration in the wound itself.

March 9 and 12.—Ordered an enema containing sulphate of soda, 15 gm.

March 16, 21, and 28.—Dressed. Exuberant granulations were touched with nitrate of silver on the latter date.

April 8 and 15.—The granulations were scraped with a sharp spoon. The wound is cicatrizing nicely.

April 19.—Allowed to sit up. No pain along the cicatrix.

April 23.—Scraped a small patch of granulation tissue.

May 6.—The patient was discharged. The cicatrix is firm, covering the internal ring, and there is no protrusion of the abdomen above or below it. The case was examined by several surgeons, including the Surgeon-General.

CASE 2.

Right inguinal hernia.

E. H.; aged forty years; a native of Ireland; was admitted to the hospital February 11, 1889, for left inguinal bubo. The patient had a right inguinal hernia of six years' duration that he desired to have operated on for radical cure. On February 26 the operation was performed as indicated. A dose of morphine was administered after the operation, and acetanilide, 33 gm., ordered every four hours.

February 27.—The bandage had to be partially loosened at the umbilicus on account of abdominal tenderness from its pressure. Nausea and tympanites in the afternoon; an injection of sulphate of soda .20, aq. 500 C. C., relieved these symptoms. Temperature, 37° 8 C.

February 28.—Abdomen still tympanitic. He felt better after the saline injection yesterday, so it was repeated to-day. The bowels moved copiously in consequence of injection. Temperature, 38°.

March 1.—Flatulent; relieved by ol. terebene on sugar.

March 4.—The case has progressed well; temperature not above 37° 4 C.; the dressing was changed; there was no suppuration; the wound was repacked with iodoform gauze.

March 6.—Stopped capsules of acetanilide and quinine.

March 11.—Changed dressing; no suppuration in wound.

March 20.—Dressed. The granulations are cicatrizing nicely.

March 28.—Dressed. Touched exuberant granulations with nitrate of silver.

April 5.—Dressed. Touched exuberant granulations with nitrate of silver.

April 12.—The wound has cicatrized. Allowed to sit up.

April 23.—The patient was discharged recovered, a firm cicatrix covering the internal ring, and no evidence of hernial protrusion of peritoneum.

CASE 3.

Right inguinal hernia.

J. S.; aged twenty-eight; a native of Scotland; was admitted to the hospital May 14, 1889. He stated that, about the first of April, while lifting a heavy weight, he felt suddenly a sharp pain in the right groin, and on the following morning he noticed a swelling in the groin. He had a truss applied, but it was far from satisfactory, so he desired to be operated on for radical cure. The hernia was an oblique inguinal hernia, with a small sac.

May 20.—The patient was chloroformed and operated on by McBurney's method. Time of operation, one hour.

May 21.—Slight nausea after taking milk last night. The wound is painful, and he did not sleep very well.

May 22.—Slight abdominal tenderness; ordered an enema of sodæ sulphate. Temperature in morning 38° 8; in evening, after enema acted, 38° 2.

May 23.—He has slight abdominal tenderness; requests another enema of soda. Temperature, 37° 8. In the evening, temperature 37°.

May 24.—As there is pain in the region of the wound, capsules of quinine and acetanilide were given every two hours.

May 25.—The quinine in capsules caused nausea; acetanilide given alone. Analgesic effect secured as desired.

May 26.—The wound was washed with a warm bichloride of mercury solution, and packed with iodoform gauze.

May 27.—As temperature is normal and there is but little pain, the capsules were ordered to be given every four hours.

May 28.—Wound washed and packed. Suppuration along chromotized catgut sutures.

May 30.—Wound washed and packed. Suppuration in small amount.

June 1, 3, 5, 7, 10, 14, 18, 22.—The wound was washed and packed as usual. The retention and other sutures were removed early in the month, and this stopped the suppuration. The granulations developed well, and the wound cicatrized as fast as could be desired.

June 29.—When dressed to-day the granulations were touched with nitrate of silver, as they were slightly fungous.

July 1.—Allowed to sit up.

July 5.—Discharged recovered.

In this case the only untoward feature was the suppuration caused by the chromatized catgut. Still the reparative process was not delayed, apparently.

CASE 4.

Double inguinal hernia.

W. J. B.; aged fifty-four; a native of Connecticut, was admitted to the hospital on May 1, 1889. While at work, in the spring of 1888, he suddenly felt a swelling in his right groin. The swelling increased in size, and so interfered with his ability to work, that he has been an inmate of different hospitals ever since.

May 2.—An examination shows a hydrocele of the right tunica vaginalis, from which 250 cubic centimeters of fluid was removed by tapping. There is a moderately large inguinal hernia of the right side, and a smaller one of the left.

May 4.—The patient was chloroformed, and each hernia operated on by the McBurney method. Time about two hours. Patient given quinine and acetanilide every four hours. On account of pain he was given morphine during the night.

May 5.—Had to loosen the bandage about the abdomen on account of its pressure. He disarranged the piece of rubber tissue placed over the dressing, and soiled the latter with urine. Temperature a. m., 38.2°; p. m., 38.6°. Morphine and acetanilide in the evening on account of pain.

May 6.—Wound dressed on account of the infection by urine; appearance is good. Temperature a. m., 37.6°; p. m., 39.4°.

May 7.—An enema of sodæ sulphate administered. Temperature a. m., 37.6°; p. m., 38°.

May 8.—Wound painful during the night. Dressed this morning. Drainage tube removed. Temperature a. m., 38.4°; p. m., 38.2°.

May 9.—Hydrocele interfering with dressing; tapped it again. Temperature a. m., 37.4°; p. m., 38.6°.

May 10.—Wound painful. Dressed; found suppuration along track of carbolized catgut sutures. Thorough douching with bromine water. Temperature a. m., 37.2°; p. m., 39.6°.

May 11.—Given quinine sulphate 1. gm. last night. Wound washed with bichloride of mercury solution, and subsequently peroxide of hydrogen. Temperature a. m., 37.8°; p. m., 38.2°.

May 12, 13, 14, 15, 16, 17, 18.—Wound dressed daily. On the afternoon of the 17th he had a chill; temperature 39.8° that evening, and 40° the morning of the 18th. He was given brandy and quinine during the night. No appreciable cause for chill.

May 19.—Temperature normal. Tapped hydrocele again 20th, 21st, 23d, 25th, 28th, 31st. Dressed; suppuration constantly decreasing.

June 2, 5, 9, 13, 17, 23.—The wounds were dressed. Nitrate of silver was applied to the fungous granulations on the three last dates.

June 27.—Wounds healed; allowed to sit up.

July 5.—Discharged recovered.

It was at first supposed that the suppuration in the wounds in this patient was due to carelessness in preserving a strict asepsis during the dressings. But as the suppuration followed the suture tracks, and in the next case the same result followed, it was subsequently attributed to the carbolized catgut.

CASE 5.

Congenital hernia of left, and acquired hernia of right, side.

V. G.; aged twenty-four; a native of Germany, was admitted May 8, 1889. He had a large congenital hernia of the left side. Three years ago, while straining in lifting a heavy piece of ice, a hernia appeared on the right side.

May 12.—Patient chloroformed; the hernia on the right side treated by the McBurney method. On the left side the hernia was pouched, rather than sacculated, the hand being easily passed into the peritoneal cavity. The sac was very thin, but it was sutured, needles being introduced at either extremity of the peritoneal pouch and that membrane sewed; the balance of the operation was by the McBurney method. Time of operation, two and a half hours. Capsules of acetanilide and quinine were given every two hours, and the patient was catheterized in order that there might be no strain on the abdominal walls.

May 13.—Bandage loosened at upper portion of abdomen on account of its constriction.

May 14.—Slight abdominal tenderness, relieved by an enema of sodæ sulphate.

May 18.—Wound dressed; in excellent condition.

May 20.—The bandage slipped during the night; redressed the wound. Has had no fever. Given an enema of sodæ sulphate.

May 26.—Removed retention sutures, as there is slight suppuration along their track.

May 31.—Wounds doing excellently; no suppuration. Touched granulations with nitrate of silver.

June 5, 9, 13, 17, 23.—Dressed the wounds. Allowed the patient to sit up on the latter date.

June 30.—Removed all dressings. Right hernia cured; but on the left side there is a small aperture that will not allow the entrance of the tip of the index finger when pushed up with the scrotal skin. The suture evidently failed to cause adhesive inflammation at that point, and so completely obliterate the sac. The weather being warm, though the patient requested it, an operation to close this aperture was deferred until fall. He was discharged recovered July 6.

This was the only case that was not completely successful, and conditions occurred in it that are infrequently met with. If the sac had been sewn more tightly, perhaps the closure would have been complete.

It is to be hoped that this excellent operation will be further tried; and if my description is not clear, a reference to Dr. McBurney's paper will probably elucidate all obscure points.

INDIRECT INGUINAL HERNIA—OPERATION FOR RADICAL CURE.

By Passed Assistant Surgeon W. A. WHEELER, *Marine Hospital Service.*

J. McK.; aged twenty-seven; nativity United States; seaman; was admitted to the marine ward, Sisters' Hospital, Buffalo, N. Y., December 6, 1888. Was ruptured some years ago and had an oblique inguinal hernia on right side; when down the tumor was about the size and shape of a goose egg. He had been operated upon in Chicago by the Heatonian method, the result of which was a violent epididymitis and no cure of the hernia. The gut would be retained by a truss, but he wished a cure. I operated on the 7th, patient under ether, incision made obliquely about 5 inches long directly over inguinal canal. The tissues around the canal were matted together, as a result probably of the astringent injection used. The sac was with considerable difficulty separated from the surrounding parts, pulled out as far as possible, and ligated high up with catgut, then cut off, and stump pushed into abdominal cavity. The pillars of the ring were drawn together with three deeply planted silver-wire sutures, the spermatic cord being very tightly held by the lower suture. The twisted ends of these wires were turned under, and the wound united as closely as possible with deep and superficial catgut sutures, with drainage. He was put to bed and kept there for twenty days, when he was allowed to get up without any support. In a week he left the hospital, apparently cured. I purposely pushed the sac stump in the abdomen that it might not remain in the line of the wound. I hope the silver wires will remain in place as a barrier to prevent the gut from getting out. I encircled the spermatic cord as tightly as I dared, that the gut might not escape behind it. I do not think we should pronounce such a case as cured until it has been under observation at least five years.

INTESTINAL OBSTRUCTION FROM ADHESIONS OF PERITONEUM—LAPAROTOMY—RECOVERY.

By Passed Assistant Surgeon P. C. KALLOCH.

G. N. ; aged thirty-eight years; nativity, Finland; was admitted to the U. S. Marine Hospital, San Francisco, Cal., November 9, 1888.

History.—About the middle of October he fell quite a distance, receiving injuries about the head and abdomen. He was unconscious during the three days immediately following the accident. When admitted to the hospital, November 9, he complained of abdominal pain confined to the umbilical region. This pain had rendered sleep impossible during the preceding forty-eight hours. He was vomiting frequently, and was unable to retain anything in the stomach. Upon examining the abdomen by palpation no tumor could be felt, but there was considerable tenderness at the seat of pain. On November 11 the vomiting became stercoraceous and the face assumed the expression often noticed in obstruction of the bowels. To relieve the condition an incision was made in the median line below the umbilicus, about 12 centimeters in length, through the abdominal wall. A hand was introduced into the abdominal cavity and the surface of the intestines explored. A portion of the small intestines, apparently contracted, was withdrawn. Near this, an adhesion was found at the junction of the mesentery with the intestines, contracting and holding down the latter. Upon further exploration a similar but more extensive adhesion was found near the same locality. The first of these was divided with scissors, the second separated with the fingers. Slight bleeding occurred from the latter point, necessitating the use of a catgut ligature. The peritoneum was now closed with a continuous suture of fine catgut. Deep, interrupted stitches of the same material, large size, were taken to close the external portion of the wound. During the operation moderate antiseptic measures were used. Antiseptic gauze and absorbent cotton were used in the dressing. During the thirty-six hours following the operation there was no pain nor vomiting. The temperature during that time was 37.4° and 37.6° C. After this the patient was quite restless, and from some cause the temperature reached 90° on November 14. By evening of the 15th it had fallen to 37.3° and was normal thereafter. The patient had several liquid stools containing some matter of a semi-solid consistence. About two-thirds of the abdominal wound healed by first intention; the remainder, outside the peritoneum, united by granulation.

The patient was discharged, recovered, December 6, 1888.

PERITYPHLITIC ABSCESS—LAPAROTOMY—RECOVERY.

By Passed Assistant Surgeon P. M. CARRINGTON, *Marine Hospital Service.*

S. H.: aged fifty-one years: was admitted to the marine ward, Mercy Hospital, Pittsburgh, Pa., on January 2, 1889, and gave the following history: On the evening of December 20, after a full meal, consisting largely of cabbage and carrots, he was taken with cramps and flatulence. He was given a dose of mustard and hot water, which produced violent retching, vomiting, and pain in the bowels, especially in the right iliac region. On the following day his bowels were very loose, and simultaneously a swelling appeared in the right iliac region: a physician was called, and ordered poultices. After about a week the pain lessened and the skin began to redden. At this stage he came under my care, and was removed to the hospital, where an examination revealed a globular, well-defined tumor 4 to 5 inches in diameter, situated in the region of the cæcum; it was fluctuating and painful on pressure. The skin was red and pus evidently present. The aspirator was used to verify the diagnosis, and 100 centimeters of landable pus removed. On January 4, with the usual antiseptic precautions, a puncture was made in the center of the swelling with a fine tenotome; this opening was enlarged by dilatation with the dressing forceps—after the manner advised by Wyeth—irrigated with a 1 to 5,000 solution of bichloride, and a drainage tube introduced. A liquid diet was ordered, and the bowels, which were constipated, moved from time to time by enemata. Daily irrigation with a warm solution of bichloride (1 to 5,000) was practiced, and the cavity injected with iodoform and olive oil. The discharge of pus gradually diminished up to the 26th of January, when I left the station on leave of absence, turning the case over to Dr. C. O. Goulding. During my absence the abscess closed up, apparently from the bottom, but after a few days it became necessary to reopen it. On my return, March 1, I found a cavity $1\frac{1}{2}$ inches deep by 3 inches in diameter, discharging creamy pus through an opening the size of a pencil; this showed a disposition to close up, but the cavity failed to granulate, even after repeated stimulation by acid carbolie, pure. It was then freely laid open from end to end, scraped out well, and packed daily with iodoform gauze. Even then the external wound showed a disposition to close too rapidly, and it was necessary to enlarge it a third time; this was done April 5 by Assistant Surgeon J. B. Stoner, then on temporary duty at this station. Granulation now proceeded nicely, and the original abscess was soon healed, but at this time a sinus was discovered, leading from the lower edge of the wound down through the layers of deep fascia to the crest of the pubis. On laying this sinus open extensive gangrene of the fascia was found. A strong solution of potass. permang. was applied daily and the necrotic fascia picked out bit by bit; after it had all been removed the wound granulated rapidly and the patient was discharged, recovered, on May 25. Although this man made an excellent recovery (being now, June 30, in perfect health), I believe he would have recovered sooner had the abscess been, in the beginning, as advised by Bryant, freely laid open from end to end; this was done finally, with a most satisfactory result. Constipation was present during the whole time, and was relieved by enemata and cascara sagrada. Loss of appetite and indigestion called for tonics and pepsin.

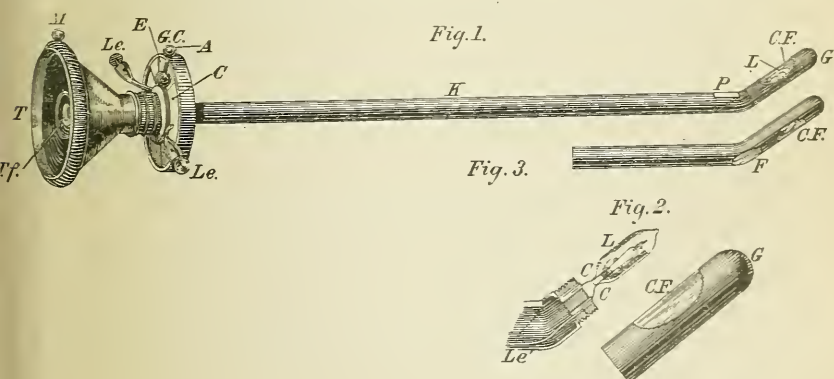
THE USE OF THE CYSTOSCOPE.

By Passed Assistant Surgeon S. T. ARMSTRONG.

Any procedure or instrument that assists the physician in making an exact diagnosis should receive a welcome from the profession, and the instrument and procedure that Dr. Nitze, of Vienna, has invented has made the diagnosis of diseases of the bladder almost exact. What the laryngoscope is to the laryngologist, or the ophthalmoscope is to the oculist, the cystoscope is to the genito-urinary surgeon.

Various procedures have been utilized, during this century, to inspect the interior of the bladder. Desormeaux invented a fenestrated sound, the fenestrum covered with glass, that he introduced into the bladder through the urethra, and then by means of a strong light on the abdomen the bladder was examined by the transmitted rays. Subsequently Bruch, of Silesia, proposed that a white-hot platinum wire be held in the rectum so as to afford the necessary illumination. Crude as this method was it afforded valuable information to those familiar with its use, and only recently Dr. F. R. Cruise (*Lancet*, 1889, I, 372), in testifying to its value, said he would not willingly wholly abandon it for Nitze's more elaborate instrument.

In 1879 Nitze announced (*Wien med. Woch.*, 1879, No. 24) the completion of a rather complex instrument for examining the bladder, employing an electric incandescent light for illumination. He elaborated his instrument, dispensing with some cumbersome features, and was assisted in the work by a Viennese surgical-instrument maker—Leiter. At present there are two instruments on the market—Nitze's cystoscope, and Leiter's modification. As the latter has been furnished for use by the Bureau, I append an illustration (Fig. I) and description of it. It consists of a hollow



silver catheter *K*, 20 centimeters long and 7 millimeters thick, having the same caliber as a 22 French sound, the beak of which is attached at an obtuse angle to the shaft. In the beak *A* is a crystal window, *CF*, covering an Edison incandescent

lamp, *L*, and at *P* is a right-angled glass prism reflecting the illuminated part of the bladder in front of it. The stem *K* contains the conducting wires connecting with the incandescent lamp. At the beak the head *G* unscrews, as shown in Fig. II, exposing the lamp *L* that is held in a simple manner in the platinum holder *CC*; and the wires *Le'*, of the battery, can be seen in position. The disk *GC* is for opening and closing the current; when it is desired to cut off the current the knob *A* is moved to the ivory plate *E*; when the current is in use the knob is left on the metal plate *C*. At *Le* *Le* are the clamps for the battery wires. At the funnel *T*, running through the sound as far as the inner side of the prism *P*, is the telescope *Ff*. *M* shows the position of the prism, enabling the observer to know the part of the bladder in view.

Fig. IV shows a cystoscope with the window and prism on the inferior surface, for viewing the posterior and inferior walls of the bladder.

Nitze's present instrument dispenses with a glass over the lamp, enabling him to employ a larger lamp; great care must be exercised in using it not to touch the bladder wall with the lamp, as it will scorch the wall. Mr. Berkley Hill refers (*Lancet*, 1889, I, 169) to a case in which a blood coagulum was so scorched, adhered to the lamp, and thus obscured the light and necessitated the withdrawal of the instrument. The telescope in Nitze's instrument magnifies, and his arrangement for the battery wire connection is more convenient. But the incandescent lamp is not as conveniently attached as in Leiter's.

Any galvanic battery may be employed, four to six cells being sufficient; care must be exercised that the current is not so strong as to destroy the lamp.

In examining a patient the instrument should be first connected with the battery, the current button being on the ivory plate, and the beak is inserted into a bowl of clean water; the current is turned on gradually, until the desired light is obtained. If the current is too strong the bamboo film in the lamp will be burnt out, and a new lamp will have to be attached. When it has been determined that the instrument is in good order the patient is placed, in the lithotomy position, on a table, and a cocaine solution injected in the urethra. A soft rubber catheter is passed, the bladder is evacuated of any urine, and then it is filled, by means of a fountain syringe, with a diluted Thiersch's solution. This injection must be made carefully, particularly if there is hæmaturia of cystic origin, for hemorrhage may be caused that will prevent any examination. The fluid that is first injected is allowed to escape, and a second injection made; the catheter is withdrawn, and the cystoscope having been lubricated with a 2 per cent. solution of boracic acid in glycerine is passed into the bladder. The light is turned on and the surgeon examines the bladder leisurely; the amount of heat generated by the lamp being small permits an examination for two or three minutes; indeed, Fenwick (*British Medical Journal*, 1888, II, 666) states that the lamp may be kept burning for an hour in a bladder containing 7 ounces of fluid, without perceptibly raising the temperature.

Mr. Whitehead, in order to have a larger field and secure better illumination by a large lamp, employs a cystoscope of a circumference of 40 millimeters, making a perineal incision in cases that will not admit this caliber by the urethra.

Mr. Berkley Hill has devised a metallic cover for the cystoscope, containing two small tubes that are used for injecting and evacuating the bladder in cases of hemorrhage that discolor the injected fluid.

The instrument may be used for diagnosing some forms of prostatic hypertrophy, for benign or malignant cystic neoplasms, for the detection and measurement of stones or foreign bodies, for ulcerations of the bladder wall, and for differentiating between renal and cystic hæmaturia. A point that has not received mention is its use in suspected rupture of the bladder.

It can not be introduced through greatly enlarged or cancerous prostates, and if the bleeding from the bladder is even slight, the redness of the fluid prevents an inspection of the walls. If the bladder is small, in consequence of long-standing disease, the examination is unsatisfactory.

Quite a number of cases have been examined with the instrument since it was received; and while the results have been negative, the familiarity with the normal appearance of the bladder acquired by this means will be of great advantage. In one case a foreign body was detected.

C. B.; aged twenty-four; negro; while being examined for stricture accidentally displaced the rubber cover of the urethrometer; it was uncertain whether it slipped into the bladder or had been lost on the floor. The patient's bladder was filled as above indicated, the cystoscope introduced, and the cover was seen lying against the anterior superior wall of the bladder, presenting the appearance seen in Fig. IV. No suitable forceps were at hand, so no interference was attempted, a slight hope being entertained that it might pass out with the urine. This hope was realized during the night, and the bladder was no worse for the temporary presence of the foreign body.



FIG. 4.

It is hoped that during the coming fiscal year some interesting cases may be observed that will be of interest for the next annual report.

BIBLIOGRAPHY.

- M. Nitze. *Lehrbuch der Kystoskopie. Ihre Technik und klinische Bedeutung.* Wiesbaden, 1889.
- E. H. Fenwick. *The electric illumination of the bladder and urethra as a means of diagnosis of obscure vesico-urethral diseases.* London, 1888.
- M. Nitze. *Beiträge zur Endoskopie der männlichen Harnblase.* *Gesell. f. Chir.*, 1887, XVI, 177.
- Fifteen cases of tumor of the bladder, diagnosed by means of the electro-endoscopic cystoscope. *Lancet*, 1888, I, 73.
- Veränderungen an meinen elektro-endoskopischen Instrumenten zur Untersuchung der männlichen Harnblase. *Illust. Monatschr. d. ärztl. Polytech.*, Bern, 1887, IX, 59.
- M. Schustler. *Beiträge zur cystoskopischen Diagnostik.* *Wien. med. Woch.*, 1886, XXXVI, 453.
- V. Dittel. *Ueber Endoskopie der Blase.* *Wien. med. Bl.*, 1886, IX, 665, 697.
- Nicholadoni. *Stecknadel in der männlichen Harnblase.* *Wien. med. Woch.*, 1886, Nos. 7 and 8.
- E. H. Fenwick. *The electric illumination of the male bladder by means of the new incandescent lamp cystoscope.* *Brit. Med. Jour.*, 1888, I, 240.
- The value of electric illumination of the urinary bladder (the Nitze method) in the diagnosis of obscure vesical disease. *Ibid.*, 1888, I, 785.
- The 'bloodless' method of removing vesical growths controlled by electric illumination. *Ibid.*, 1888, II, 666.
- Clay and wax modeling of the living urinary bladder under electric light. *Ibid.*, 1889, I, 13.
- Fifteen months' experience of electric illumination of the bladder, in the diagnosis of obscure vesical disease. *Ibid.*, 1889, I, 989.
- W. Meyer. *On cystoscopy and the new cystoscope of Nitze and Leiter; with demonstrations of the same.* *N. Y., Med. Jour.*, 1888, XLVII, 436.
- W. Whitehead. *A new incandescent lamp cystoscope.* *Brit. Med. Jour.*, 1888, I, 768.

- F. M. Otis. Papillomatous tumor of the bladder, demonstrated by means of Leiter's cystoscope; diagnosis confirmed by subsequent inspection through suprapubic opening of the bladder; successful removal. *Med. Record*, 1888, XXXIII, 493.
- H. Thompson. Clinical lecture on Leiter's endoscope in the treatment of vesical disease. *Brit. Med. Jour.*, 1888, I, 775.
- A. Broca. De la cystoscopie ou endoscopie vésicale. *Gaz. Hebd. de Méd.*, 1889, XXVI, 166.
- O. K. Newell. Diagnosis of tumors of the bladder and stone with the cystoscope. *Boston, Med. and Surg. Jour.*, 1889, CXX, 381.
- F. A. Southam. On endoscopy in tumors of the bladder. *Lancet*, 1889, I, 729.
- G. Barling. The electric cystoscope and the method of using it, with notes of cases. *Birming. Med. Rev.*, 1889, XXV, 257.
- J. Verhoogen. De l'endoscopie de l'urètre et de la cystoscopie. *Jour. de méd., chir., et pharm.*, Brux., 1889, I. XXXVII, 161.

TWO CASES OF SUPRA-PUBIC CYSTOTOMY FOR HÆMATURIA.

By Passed Assistant Surgeon S. T. ARMSTRONG.

The following cases illustrate the difficulty of localizing the site of hemorrhage in hæmaturia, and present some features of interest that may be worthy of consideration.

CASE 1.

Epicystotomy for hæmaturia in case of fracture of vertebræ.

C. E.; aged thirty-four; a native of Germany, was admitted to the U. S. Marine-Hospital, Stapleton, N. Y., on October 3, 1888. On October 2 he fell through a hatch from the main deck to the lower hold, about 23 feet in depth, striking on both feet and rebounding, his back striking against the edge of a box. He was taken to Gouverneur Hospital, and transferred from it.

When admitted there was paralysis of motion and sensation of each lower extremity; the bladder and rectum being involved, the urine was evacuated with a catheter. The examination did not reveal any rupture of the vertebræ. Motion and sensation in upper extremities and body normal.

On the 5th he had pain in the spine, and counter-irritants were applied.

October 6.—The urine was bloody when drawn this morning. The hæmaturia increased daily, becoming so severe that clots would fill the catheter.

On the 11th the mass of contained clot became so large that the bladder could not be evacuated, and the pain therefrom was intense. Epicystotomy was advised, and the pubis was shaved and the adjacent region cleansed. The distension was so great that neither the rectal bag nor cystic injection was required. Assisted by the staff I dissected down to the bladder and incised it, evacuating a quantity of fluid and clot. The interior of the bladder was examined by electric light, and the entire mucous membrane presented a red, granular condition, resembling the palpebral conjunctiva in a severe case of trachoma. The hemorrhage was evidently cystic, as no bloody urine escaped from the ureters. The bladder was irrigated with a strong solution of nitrate of silver (20 per cent.), a rubber drainage tube was introduced into the cavity, and the wound dressed antiseptically. He did not react well from the anæsthetic (ether), gastric irritability persisting for some time.

The wound was dressed daily, the bladder irrigated each time with a mild carbolic solution. The patient, however, rapidly lost strength, and died on the 26th.

At the necropsy, made sixteen hours *post mortem*, the viscera were found in normal condition. There was a fracture through the body of the first lumbar vertebra, allowing pressure on the cord. Death from exhaustion.

CASE 2.

Epicystotomy for hæmaturia.—Subsequent death from pyonephrosis.

V. S.; aged twenty: a native of Sweden, was admitted to the U. S. Marine Hospital, Stapleton, N. Y., on December 6, 1887. He had gonorrhœa in 1882 and treated himself for the disease for the two years that it lasted. In June of 1887 he acquired a new attack of the disease, and was treated by the captain at sea. When admitted the gleet existed with occasional blood clots in the urine. An examination of the urethra with an endoscope showed congestion of the mucous membrane. A 31 bougie-à-boule caught at 3 centimeters from the meatus. Prostate was enlarged. The bleeding was attributed to the gleet, and the usual treatment for that disease pursued.

• *December 24.*—Endoscope reveals the same condition of the urethra as before. The prostate is still tender; pain in walking.

December 30.—He states that he has itching in the perineum during the night, and on January 1, 1888, there was rectal soreness, with general urethral tenderness after micturition. The gleet has ceased. Poultices were applied to the perineum. Suppositories of belladonnae.

January 7.—Perineum well; stopped poultices. Rectum improved.

January 11.—Feeling better; no blood in the urine during the night. Has been using a buchu mixture for some days past. The prostate is still enlarged and tender.

January 13.—Bladder feeling sore, washed it out with a biborate of soda and glycerine solution. Capacity of bladder about 250 cubic centimeters. The presence of the blood clots in the urine that accumulates during the night, and the fact that the patient acquired the gonorrhœa while in Japan, suggests the possibility of the presence of the *Bilharzia hæmatobia*.

January 23.—The rectum is sore again. Repeated examinations of the urine both by myself and Assistant Surgeon J. J. Kinyoun fail to reveal the presence of the ova of the suspected parasite, or of any villi of a cystic tumor.

January 28.—The pain in the rectum and the urethra is unchanged; blood still present in the urine. A sound introduced into the dilated bladder can be rotated to the right, but on the left side there is resistance.

Various remedies were employed in succession to stop the hemorrhage, but with no success. On June 7 the urine is noted as being occasionally purulent. The weather apparently exercises no influence on the hæmaturia.

August 5.—The patient was taken to Dr. A. G. Gerster, who had kindly consented to examine the bladder with his cystoscope. He noted the left prostatic hypertrophy that I have referred to above. On the anterior wall of the bladder a blood clot was seen; as its gravity would apparently make it lie at the bottom of the viscus, it seemed a justifiable conclusion that there was a source of hemorrhage at that point, particularly because no bloody urine came from the ureters. Both Surgeon Wyman and myself examined the bladder and noted the above facts.

August 8.—Dr. Gerster made another cystoscopic examination to-day, finding a blood clot in about the same position as before. Apparently the hemorrhage was cystic, and he advised stronger injections than were used when a provisional diagnosis of cystitis (gonorrhœal) was made. Injections of nitrate of silver were made on the 10th, 11th, and 16th, and every other day thereafter. On September 5 it was noted that injections had been discontinued since the 1st. The urine was dark and bloody during the entire time that the injections were employed. There was persistent pain in the left lumbar region. No renal enlargement.

On September 8 and October 7 he had a chill with subsequent fever. Quinine was administered at once and prevented a repetition.

October 22.—Dr. Gerster re-examined the bladder with the cystoscope, and on the anterior surface of the bladder was a dark mass that occluded the fenestra of the cystoscope.

October 31.—An epicystotomy had been decided on in order to examine the dark mass referred to, and to give the bladder rest. On account of the courtesy Dr. Gerster had shown he was invited to operate, and did so. The patient was prepared in the usual manner, the rectum dilated with the rectal bag, the bladder filled with Thiersch's solution, and after the usual dissection the bladder opened. The coats of the bladder were thickened, and on the upper surface a diverticulum was found that accounted for the dark spot shown by the cystoscope. The patient was dressed, reacting well from the operation.

The bladder was irrigated daily with a boracic acid solution. On November 15, urine was passed by the urethra; by December 19 the abdominal wound had healed.

The patient was losing flesh, and did not feel strong. On January 7, 1889 he had nausea without appreciable cause.

January 21.—Had abdominal tenderness from the right hypochondrium to the iliac region; the left side was much less tender. The urine was turbid and pus was found in it.

February 18.—The hypodermatic needle of an exploring syringe introduced into right loin withdraws pus. He was readmitted for pyonephrosis. His weakness and a suspicious dullness of the right chest, believed to be due to tubercular deposit, did not justify an immediate operation. March 1 the abdominal cicatrix re-opened, and a small quantity of urine escaped from a minute fistula. On the 2d a thick diphtheritic deposit formed on the cicatrix; it was covered with a bromine water pledget and the bladder was washed out daily with Thiersch's solution.

The patient was growing weaker; he had no appetite, and occasionally would have attacks of vomiting. On the 23d a hypodermatic needle was introduced in the right side of the back, below the ribs, but no pus could be withdrawn.

April 25 a soft, fluctuating spot was detected on the right side below the ribs. It was aspirated and pus was obtained. On the 26th the skin was incised and an abscess cavity found extending below the crest of the ilium. It was evacuated, irrigated, drained, and packed with gauze.

The abscess cavity was washed out daily, but the patient did not improve, dying on May 10.

At the necropsy the lungs were found to be œdematous; slight thickening of the bronchii in the right, and a cicatrix undergoing calcareous degeneration in the apex of the left. The heart was normal. The left kidney showed purulent inflammation of parenchyma. The right kidney was converted into a pus sac, the capsule being thickened; and posterior to it was a large abscess cavity, into which the incision was made. The bladder had a fistula from its anterior wall to the skin; the mucous membrane was congested. Prostate slightly enlarged.

This case is of interest on account of the development of a nephritis (probably gonorrhœal), its long persistence degenerating into a pyonephrosis. The failure to withdraw pus on March 23 was probably due to the small caliber of the needle. The formation of an abscess posterior to the kidney is of interest, as it was presumed the capsule of the kidney was incised, whereas the necropsy showed it intact. Beyond a diagnostic value, the epicystotomy was of small account, though it did not complicate the case. The degeneration of the left kidney showed that it would have been unequal to the task of carrying on the renal excretory function, and had the right kidney, or pus sac, been evacuated the final result would have been the same. It must be recalled that when the patient was first admitted the pain was in the left renal region rather than the right, making it probable that the left kidney was first inflamed and partially recovered.

PISTOL-SHOT WOUND OF BLADDER, FOLLOWED BY VESICAL CALCULUS—SUPRA-PUBIC LITHOTOMY— RECOVERY.

By Assistant Surgeon C. P. WERTENBAKER.

S. M.; colored; age, 29; nativity, Virginia; admitted to marine ward of St. Vincent's Hospital, Norfolk, Va., November 12, 1888; discharged December 15, 1888, recovered.

Upon admission the patient gave the following history: Some six months previous he had received two shots from a 32-caliber pistol. One shot passed entirely through the fleshy part of left thigh, the wound healing without trouble. The other ball entered about 3 centimeters below the umbilicus and about 2 centimeters to the right of the middle line, passed inward until it struck the linea alba, and then ranged downward and could not be traced. The patient was intoxicated at the time of the shooting and delirious for two days afterward, but states that when he recovered consciousness he suffered from intense pains in the lower part of the abdomen, in the lumbar region, and along the urethra at every attempt at urination, the desire to urinate being frequent. At times there would be a sudden stoppage of the urine, but the flow would recommence after a few moments. More or less blood would follow the urine at every act of micturition. He recovered from the wounds without trouble, but upon admission he was suffering from cystitis, which he states had existed ever since a few days after the shooting had occurred. Examination of the bladder with a sound revealed the presence of a stone. On November 16, 1888, the patient was etherized, the bladder injected with a saturated solution of boracic acid, and supra-pubic lithotomy was performed under antiseptic precautions. The superficial incision extended upward, in the middle line, for about 12 centimeters above the symphysis pubis; the underlying structures were then in turn divided, and the bladder was washed and drawn upward and forward by two sutures passing through its walls; between these sutures an incision was then made on the projected end of a catheter previously introduced through the urethra, the gush of fluid indicating when the cavity of the bladder was reached. Exploration of the cavity was then made with the finger and a calculus 5 centimeters long by 3 thick was found and removed. Further examination showed the mucous membrane to be thickened and in a state of chronic inflammation, but no trace of the bullet or other foreign substance could be discovered.

The opening in the bladder was then closed with catgut, and the superficial wound with silk sutures, an iodoform dressing was applied, the bladder washed out with boracic acid solution, and a soft gum catheter introduced and retained in the bladder by adhesive strips. The patient was then put to bed and given .03 gm. of morphia. He rested fairly well during the following night and day, there was slight nausea, and the temperature rose to 38.4° C. and remained so until the third day after the operation when it rose to 42° C., this increased temperature being accompanied by hypogastric pains and tenderness and vesical tenesmus. An examination showed that the catheter had become clogged with blood clots and that the accumulated

urine was escaping through the abdominal wound. The administration of antipyrine and the introduction and retention of a catheter having a larger caliber was followed by the disappearance of these unpleasant symptoms. The bladder was washed out daily with a solution of boracic acid and morphia and antipyrine exhibited occasionally indicated. No other untoward symptoms presented themselves until about a week after the operation, when the patient removed the catheter during the night; this was followed by the accumulation and overflow of urine through the abdominal wound and was attended with the discomfort to be expected therefrom.

Improvement from this time on was progressive; the patient was allowed to walk about, and the washings finally discontinued; it was noticed, however, that a small amount of the fluid injected, and sometimes urine, would escape from the superficial wound as late as the tenth day after the operation; from this date, however, the fistulous opening closed, and the patient was finally discharged, recovered, December 15, thirty days after the operation.

An examination of the calculus showed it to be phosphatic in character, having formed around a shred of cotton cloth as a nucleus. As no ball could be found in the bladder it was concluded that it must have pierced the walls of the bladder, carrying with it this shred from the shirt of the patient, and then passed out of the bladder either by again piercing its walls and burying in the surrounding tissues or it passed out through the urethra. Within the first few days after the shooting the patient had no hemorrhage or the passage of anything of the kind through the urethra. There was no extravasation of urine into the tissues at any time in the history of the case.

PERINEAL ABSCESS FOLLOWING URETHRAL STRICTURE.

By Passed Assistant Surgeon S. T. ARMSTRONG.

In the annual report for 1884 I reported two cases of perineal abscess, one following stricture, one caused by traumatism. The following cases, treated at the United States Marine Hospital, Stapleton, N. Y., possess some points of interest:

CASE 1.

T. T.; aged twenty-five; a native of Norway: was admitted September 21, 1887. He was treated in 1882 for chancre and in 1885 for syphilitic rupia. He first incurred an attack of gonorrhea six weeks previous to his admission. He used an injection that burnt him severely, and on the 9th instant his perineum commenced to swell. When admitted the perineum was swollen and tender; there was a thick, yellow discharge from the urethra and *ardor urinae*. Hot fomentations applied to the perineum, capsules copaiba for the gonorrhea. On the 2nd the perineum was lanced, no anæsthetic being used. A discharge from this opening continued until the 16th of November, the perineal swelling diminishing slowly, but a fistula persisting.

December 8.—Filiform bougies were passed into the bladder, but this procedure failed at several subsequent attempts until the 26th, then a Maisonneuve was introduced and the deep urethra incised.

December 28.—A 28 F. sound was passed, and this was repeated at intervals. But there was still a cicatricial process going on, and on the 1st of February, 1888, the stricture was incised with Otis's urethrotome. On the 3d he developed urethral fever (pulse 114, temperature 40.4° C.) for that day only. Subsequently sounds were passed at regular intervals and the patient was discharged March 1 with a urethral caliber of 30 millimeters.

If the patient had been anæsthetized when the perineal incision was made, the perineal wound cleansed as thoroughly as possible by scraping with a sharp spoon, and the urethral strictures completely divided, the duration of treatment would have been materially shortened, without causing any risk to the patient. The deep urethral inflammation and consequent abscess formation was, if not caused, certainly aggravated by the strong injections he employed.

CASE 2.

J. H. C.; aged forty-four; a native of Louisiana; was admitted January 19, 1888. He first had gonorrhea in 1867; the disease lasted some time, as he treated himself. For five years he has had stricture of the urethra. He arrived in port twelve days before admission, and had a swelling in the perineum. He consulted a physician, and was ordered to apply hot water. January 14 he had retention of urine, and went to Long Island College Hospital. The bladder was aspirated on the 15th and perineal section made on the 16th. When transferred to the Marine Hospital the scrotum was

tense and tumified, the perineal wound gangrenous; hot fomentations were applied, and iron and quinine given internally every two hours. On the 20th the wound was washed every two hours with a 10 per cent. solution of bromine water. On the 21st the wound was cleaner; a spontaneous opening appeared on the scrotum, to the right of the penis. The bowels were evacuated by a cathartic. The temperature fell to normal, the purulent discharge decreased daily, and patient did well until February 12, when the perineal opening closed and retention of urine resulted. At 7 a. m. there was a stricture of the urethra, admitting an 11 F. sound; the stricture was cut on the 13th with a Maissonneuve urethrotome. On the 24th a Thompson's divulsor was passed over a whalebone guide and the urethra slowly dilated to 20 F.; at this caliber he suffered much pain and dilation was stopped.

Dilatation of the urethra was regularly practiced, but an induration of the deep urethra persisted, and this seemed to prevent dilatation to normal caliber. March 23 the urethra was dilated by Otis's urethrotome to 30 F., and on the 31st the indurated cicatricial band was incised. A 29 F. sound was subsequently passed, and the case discharged on April 16.

Urethrotomy was not performed immediately in this case, because the patient was so exhausted for some time after admission that further complication by any operative procedure was deemed inadvisable. A urethrotomy should, of course, have been performed when he first became cognizant of the existence of a stricture.

CASE 3.

J. B. E.; aged twenty-five years; a native of the United States; was admitted to the hospital February 14, 1889. He had gonorrhœa first in 1884; again seven weeks previous to his admission. Has gonorrhœa and unusual urethral tenderness; the scrotum was very much enlarged, inflammatory induration extending from it to the posterior portion of the perinæum. There are urinary fistulæ internal and anterior to either tuber ischii; the fistulæ suppurate, but a probe can not be made to pass through them. He stated that he had a perineal abscess with the first attack of gonorrhœa, and was treated in Bombay; the urinary fistulæ resulted from the incisions then made, but they subsequently healed spontaneously. On the 16th the bladder could not be entered by a filiform bougie on account of false passages. On the 18th the patient was chloroformed, the pubes, perinæum, and thighs having been shaved and thoroughly cleansed, the perinæum and scrotum were incised, and the abscess cavity thoroughly cleansed with a warm bichloride of mercury solution. The deep urethra was then incised, and the bladder evacuated through a catheter. A false passage extending from the membranous urethra to the perirectal connective tissue was scraped with a sharp spoon, and each of the fistulæ was scraped. The wound was packed with mercuric chloride gauze. The patient reacted well; was ordered brandy and vichy, and given acetanilide and quinine aa .15 every two hours. Catheter in bladder for drainage. On the 19th and 20th the wound was washed with bromine water; on the latter date the catheter was removed; it was covered with a heavy phosphatic deposit. On the 21st the penile urethra was incised with Otis's urethrotome, a catheter passed into the bladder, and irrigations of warm Thiersch's (boracic and salycilic acids) solution employed. On the 22d, as there had been a normal temperature from the date of operating, the antipyretic was discontinued. On March 1, as there is a contraction of the urethra along the line of the cicatrization, a Maissonneuve urethrotome was introduced, the urethra incised, then an Otis urethrotome was passed and the urethra incised at 32 F. The urethra was dilated at regular intervals, and the perineal wounds having healed, the patient was discharged, recovered, April 22.

CASE 4.

D. McC.; aged fifty-five; a native of Ireland; was admitted to the hospital in April for an ulcer of the leg. While examining the patient one day a perineal fistula and abscess were found.

He stated that he first had gonorrhœa in 1854, and again in 1859, each time treating himself. A gleet followed the last attack, and in 1862 he had a severe attack of gonorrhœa complicated with bubo and orchitis. He had gleet after this, very often.

In 1874 he consulted a physician in San Francisco for stricture, and internal urethrotomy was performed. He was so alarmed at the bleeding that he never returned to have the cure completed.

In 1882 the difficulty in micturating increased, and an abscess appeared in the perinæum through which urine escaped. The abscess would heal, but recur, and a fistulous track remained.

May 23 he was chloroformed. It was impossible to pass a sound into the urethra. Maissonneuve's urethrotome was introduced on its guide, the stricture was incised, then an Otis urethrotome was introduced, dilated to 33, and the strong fibrous bands cut. A 33 F. sound was passed, and the fistulous track dissected out, a drainage tube introduced into the bladder through the perinæum, and the urethra and wound thoroughly irrigated with a warm Thiersch's solution. Time of operation, twenty minutes.

May 24.—His temperature was 38.2°, so quinine and acetanilide were given every two hours. The wound and urethra were washed daily with Thiersch's solution, and iodoform gauze was packed about the bladder drain.

May 30.—Thompson's divulsor was passed and slowly dilated to 30. Has had no fever.

June 7.—No urine escaped by the perineal wound. Introduced a 33 F. sound.

June 13, 20, 27.—The sound (33 F.) was passed.

July 6.—Passed the sound yesterday afternoon; had a chill at 5 o'clock this morning. Slight bleeding after passage of sound. Quinine and acetanilide stopped the fever.

The patient was discharged, recovered, on July 22.

CASE 5.

A. W.; aged sixty-two; native of Pennsylvania; admitted June 30, 1889. About three weeks ago he felt a throbbing pain in the perinæum that increased after micturition. He found that a swelling had commenced in that locality that steadily increased in extent. When admitted the perinæum and scrotum were inflamed and tender. He had gonorrhœa in 1864, no attack of that disease since. He was treated in New York for stricture ten years ago.

June 4.—Chloroformed. The perinæum was incised and a cupful of pus escaped. The urethra was dilated to 36 by an Otis urethrotome and incised. The perineal wound was continued to the urethra and a rubber tube passed into the bladder. The patient was given quinine and acetanilide. There was a large mass of inflamed tissue in the perinæum, going back to the prostatic region, but it was not broken down, so iodoform packing was introduced about the drainage tube.

June 5.—Urethra and wound washed with Thiersch's solution. The drainage tube was forced out of the bladder.

June 13, 20, 27.—Has had no fever. Passed 30 F. sound into bladder.

July 8.—Passed 32 F. sound into bladder. The inflammation in the perinæum has decreased.

July 11.—Perineal opening closed.

July 28.—Yesterday the patient noticed slight moisture about the cicatrix in the perinæum. An examination showed that a fistula existed. It was incised, scraped with a sharp spoon, and packed with iodoform gauze. The operation was aseptic; no febrile reaction followed. The patient was discharged, recovered, in August.

These reported cases demonstrate that an early incision and evacuation of the perineal abscess, and thorough urethrotomy, all under antiseptic procedure, afford promise of successful termination of the disease with a healthy condition of the parts concerned.

RESECTION OF VERTEBRÆ FOR FRACTURE.

By Passed Assistant Surgeon S. T. ARMSTRONG.

A. A.; aged twenty-eight; a native of Dalmatia; was admitted to the U. S. Marine Hospital, Stapleton, N. Y., August 31, 1888, having been transferred from Richmond. Acting Assistant Surgeon I. H. White sent the following history: "The patient was admitted on June 3; he said that on the morning of that day, while assisting the engineer in clearing the ship's air-pumps, the props holding the floating top became displaced, and the top—weighing about 2,000 pounds—slowly descended with a rotary motion, catching him within the pump in a sitting posture, causing extreme anterior flexion of the body. Sensation and motion were abolished below the umbilicus, and a diagnosis of fracture of the lumbar spine was made. During the hot weather in June, bed sores formed over the gluteal, sacral, and lumbar regions, and, later in the season, on the heels. Bromide of potash with ergot was given to combat myelitis during the first month: the bed sores were sprayed with a bichloride solution (1 to 2,500)."

When admitted at New York, the condition was practically the same as above noted. The patient was greatly emaciated; he had hectic fever. His condition slowly grew worse, and it was thought that there might be necrosis of the vertebræ with suppuration. There was a marked angling in the lumbar region.

On October 8 the patient was chloroformed, and, assisted by the staff, resection of the vertebræ was made. An incision was made over the spines of the last dorsal and first lumbar vertebræ, the muscular mass dissected away, and the spines of the twelfth dorsal and first lumbar vertebræ removed, exposing the canal. The membranes of the cord appeared normal, the cord itself being atrophied, and there was no septic fluid in the canal. The anæsthetic was discontinued during the operation, and, as there was anæsthesia of the tissues, the operation was completed without chloroform. There was a perceptible angling of the vertebral column, but no pressure was exerted on the cord. The wound was accordingly dressed antiseptically, further operative interference not being indicated.

No improvement in sensation or motion followed the operation. The hectic fever caused by the large granulating and suppurating sores produced by the vaso-motor paralysis continued. The patient died on October 15.

The necropsy was made eighteen hours *post mortem*. *Rigor mortis*; cadaver of an emaciated male; large granulating ulcers at the localities mentioned in the foregoing history. The right lung was adherent to the costal pleura by well-formed fibrinous adhesions; the lung was œdematous; weight, 743 grams. The left lung was adherent to the costal and diaphragmatic pleura by recent adhesions; a cavity containing pus was found in the lower lobe; the lung was œdematous; weight, 773 grams. Heart, normal; flaccid; weight, 285 grams. The liver was fatty, and contained numerous small purulent foci; weight, 2,105 grams. The right kidney evidenced parenchymatous inflammation; the pelvis was congested, and contained twelve small calculi; there was a necrotic ulcer at the urethral orifice; weight, 185 grams. The left kidney similar to the right. Thirty-four small calculi in pelvis, no

ulceration: weight, 200 grams. The spleen weighed 240 grams; it was pulsatous. The pancreas was normal; weight, 88 grams. The bladder contained purulent urine; no calculi in it. Intestines normal. Septic abscesses were found beneath each psoas muscle, and between the right scapula and the ribs; the periosteum of the ribs, at the site of the abscess, was destroyed.

On removing the vertebral column a fracture of the body of the third dorsal vertebra was found, almost the entire right half of the body being absorbed. There was, also, a fracture of the anterior superior edge of the body of the twelfth dorsal vertebra. No fracture of other bones.

In this case the operation was of no benefit, for the pressure on the cord in the region of the twelfth dorsal vertebra was demonstrated as of small consequence. There was no septic matter in the canal. The fracture of the third dorsal was unrecognized during life. At the necropsy no pressure of the cord was found at this site. The large ulcerating surfaces offered an excellent opportunity for septic infection, and it was impossible to heal them on account of the trophic disturbance.

While the question of operative interference in these cases is as old as the days of Paulus Æginetus, as far as is known the present century first witnessed the application of this surgical procedure.

The results of the operation have not been encouraging, though temporary relief has occasionally followed.

On the other hand the fixation of the trunk, after extension in Sayre's suspension apparatus, is a procedure that commends itself for trial in all recent cases of fracture of the spine. Sayre reports (*Orthopædic Surgery*, p. 488) three cases of paralysis consequent upon fracture of the vertebrae that recovered with the plaster of Paris jacket.

Wyeth (*Surgery*, p. 299) reports a case of recovery from fracture of the eleventh and twelfth dorsal and first lumbar vertebrae by extension and plaster of Paris jacket.

Dr. H. L. Burrell, in an excellent paper (*Med. Public.*, Harvard Med. School, 1887), reviews the histories of eighty-two cases that were treated at the Boston City Hospital. The fractures were, cervical, twenty-eight; recovered, two; upper dorsal, twelve; recovered, four; lower dorsal, nineteen; recovered, one; lumbar, twenty-three; recovered, ten; a total of sixty-four deaths and eighteen recoveries. Crepitus was present in fifty-one; deformity in sixty-three; complete paralysis in sixty-seven; incomplete paralysis in six; eighteen were unconscious; twelve were delirious; eighteen had priapism; thirty-one had cystitis.

In two cases Dr. Burrell applied the plaster of Paris bandage while the patient was suspended; each recovered.

He collected reports of eleven cases treated this way, nine recovering, one result not stated, one patient died.

The firm ligamentous union of the vertebrae would insure the comparatively close coaptation of fragments, and reduction of any deformity caused by them, when the patient was suspended. This may exercise a therapeutic effect in the myelitis that usually occurs in these cases. The fixation of the body in a plaster of Paris bandage preserves the approximation of the fragments, and bony union should proceed as in a fracture elsewhere. The suspension is usually very painful and it is best to anesthetize the patient before suspending him.*

It is scarcely necessary to state that the application of the bandage should be made as soon after the accident as possible, in order to prevent further injury to the cord by pressure of misplaced fragments. Yet in one of the cases of improvement reported by Dr. Sayre, paralysis had existed for two years when the plaster of Paris jacket was applied.

*The more recently invented method of "hammock suspension" affords in many cases a much more safe method of applying the plaster, and is said to be equally efficient.—ED.

ROUND-CELLED SARCOMA OF THIGH—AMPUTATION AT THE HIP-JOINT—DEATH.

By Passed Assistant Surgeon W. D. BRATTON, *Marine Hospital Service.*

F. S.; aged thirty-seven years; nativity, Germany; admitted to U. S. Marine Hospital, San Francisco, Cal., December 11, 1888; died December 16, 1888.

History.—When seventeen years old the patient sustained an injury of some kind to the left thigh, which fact was recalled when, some ten years ago, he sought relief at this hospital for a deep-seated pain in the same region; this pain came on without apparent cause. Treatment gave no relief and pain has been more or less constantly present ever since. Some eighteen months ago, together with increase of pain, a swelling was first noted on the outer side of lower end of shaft of left femur, or rather of the thigh in that region. Pain and swelling gradually increased. About two months ago the tumor rapidly increased in size, and within the last fortnight the skin over the most protuberant part ulcerated and a dark bleeding fungus appeared. Considerable loss of blood occurred on several occasions and a pressure bandage was necessary to control the hemorrhage. All this time he continued his active occupation as seaman until admission to hospital; then the tumor reached from the outer condyle half way up the outer side of the shaft with a globular enlargement just above the condyle; its volume was that of a large coconut. The bleeding fungus protrusion escaped where the skin had ulcerated over a space some 4 centimeters in diameter.

The patient was yellow and cachectic in appearance, but not apparently much reduced. There was slight enlargement of the inguinal glands on both sides, rather more on that of the tumor. There was no evidence of metastatic deposit in the internal organs, his muscular development was good, and his tissues fairly firm. He complained of constipation and loss of appetite. Lost considerable blood from a hemorrhage just before admission.

The origin of the neoplasm was evidently either in the bone or the periosteum. Scarcely in the bone, for he was still able to walk without difficulty, and therefore most probably in the periosteum; and probably, too, in the periosteum over the lower end of the shaft of the bone, for the center of the tumor overlay that point.

The precise nature of the growth was undetermined. It was evidently malignant, bulging and elastic to the feel, with discolored inflamed skin adherent about the ulcerated part; veins turgid and enlarged. It seemed most probably a round-cell sarcoma of the periosteum, taking into consideration the apparent absence of glandular infection and metastatic deposit elsewhere. No albumen in urine.

December 16, 1888, amputation at the hip-joint was decided upon, and after injecting one-fourth grain morphine and one one-hundred-and-twentieth grain atropine, chloroform was administered and anæsthesia was continued by ether. The modern aseptic methods were fairly well observed.

During the time occupied in producing anæsthesia the limb was elevated to allow reflux of blood, and as soon as the patient became unconscious the aortic tourniquet was applied.

The limb was then amputated at the hip-joint by the antero-posterior flap method. There was a gush of venous blood, but the loss from the arteries was almost nil, and the loss of blood altogether was comparatively small. After tying the vessels and removing the tourniquet venous and capillary oozing soon ceased altogether, and the wound was closed with silk sutures, a couple of small drainage tubes being laid together at the bottom and brought out at each angle of the wound, which was then dressed with many layers of cheese-cloth wrung out of a solution of bi-chloride of mercury, 1 to 1,000.

There was considerable shock, but the patient appeared comfortable and in a fair way to react. But about one and one-half hours after the operation he became pale and cold, almost unconscious, bathed in cold sweat, and the dressings were found to be saturated with blood. The aortic tourniquet was again applied, a hypodermatic injection of one one-hundredth grain atropine administered, and the wound re-opened. A mass of clots and fluid blood was cleared away, and a vessel of some size secured, either a large muscular branch or one of the branches of the profunda. There appeared to remain only a slight oozing and the flaps were again sutured and dressed as before. Probably 12 ounces of blood were lost.

Meanwhile whisky was freely given by the mouth and under the skin, and the pulse, which had been imperceptible, became once more apparent in the wrist. But the reaction was only partial; inhalation of ether, hypodermatics of whisky, ether, and ammonia, and the application of hot bottles were without effect. He died at 4.10 p. m., some five hours after the operation.

Necropsy (twenty-three hours after death).—Rigor very pronounced; skin of yellowish tinge a gangrenous spot over each pectoral; muscle where aq. ammonia had been injected. On re-opening the stump there was found probably 3 ounces of blood in all, including the amount on the dressings.

Thorax.—The lungs and pleura appeared perfectly healthy. Heart was very fatty. Its walls were thinned, pale, and softened and somewhat dilated. It contained no clots and was not distended with blood, though some dark fluid blood escaped from left ventricle upon section. There appeared to be some fatty or fibrinous thickening of the edge of mitral valve, but probably no functional impairment. There was an irregular patch of smooth fibrinous inflammatory membrane, some 3 centimeters in diameter, on the anterior surface of the heart, and a corresponding rougher lesion on the opposite parietal layer of the pericardium. No adhesions.

Abdomen.—The liver was rather undersized, but in appearance extraordinary. It was of a dark livid gangrenous hue, mottled or marbled with spots of a more nearly normal color, soft and friable. Upon section it seemed nearly bloodless and of the same marbled appearance. There was no odor of decomposition, as the appearance of the organ seemed to promise.

The spleen was nearly normal in size, dark and pulpy. The kidneys were of the usual size, somewhat lobulated, the capsule easily detached. Upon section the cortex appeared thinned, somewhat pale and yellow, rather more friable than normal. They had both undergone fatty degeneration to some extent. There were no nodules or enlarged glands in the mesentery or elsewhere.

There was fat everywhere. In the abdominal walls, about the heart, in the omentum, mesentery, and pelvis of the kidneys it was abundant. Fatty degeneration was far advanced in the muscular tissue of the heart and in the parenchyma of the liver, and to a much less degree in the kidneys. In this fatty degeneration, especially of the heart, lies most probably the explanation of the failure of many subjects to react from shock, under stimulus of any kind or amount whatever. In this case, of course, was superadded the secondary shock of subsequent hemorrhage.

The amputated limb was now examined. The size and situation of the neoplasm and its external characters have already been noted in the history of the case. A section was made longitudinally, so as to half the tumor and expose the bone. It was then seen that superficially, and extending half way down to the bone, the ves-

sels of the tumor had given way and its substance was full of dark clots. The deeper parts of the tumor, in consistency and appearance, were almost exactly similar to the white brain matter. A considerable amount of oily fluid escaped when the section was made.

The neoplasm did not appear to have infiltrated the neighboring muscles. They were pushed aside and atrophied rather. It seemed to grow from the periosteum over the outer semi-circumference of the femur, from the outer condyle to the middle of the shaft, and over all this area the periosteum was either detached already or easily detachable. Over about the middle third of this area the bone was roughened. Sections of the bone through this region showed marked thinning of the compact tissue and a dark oily marrow. A section within 4 centimeters of the trochanter showed also the same peculiar medulla, but the compact tissue was healthy looking. Amputation short of the hip would scarcely, if the state of the medulla be considered, have been justifiable.

GUNSHOT WOUND OF SKULL, WITH PENETRATION AND ABSCESS OF CEREBELLUM.

By Acting Assistant Surgeon CHARLES STYER, *U. S. Marine Hospital Service.*

A. F.; aged thirty-two years; nativity, Massachusetts; admitted to the marine ward of the German Hospital, Philadelphia, Pa., February 25, 1889; died.

History.—Family history good. Personal history unsatisfactory on account of his mental condition, which was thought to indicate alcoholism. He complained of headache and his gait was staggering; his intellect was clouded and his ideas and conversation disconnected and wandering. His pulse was slow, respiration regular, bowels torpid, and he had a constant tendency to sleep. There was, however, nothing which pointed clearly to the serious brain lesion which was finally discovered, and which must have existed for a considerable time. There was at no time any paralysis of muscular movement except an unsteadiness of gait, and a scarcely noticeable deviation of the tongue to the left when protruded. His treatment was confined chiefly to measures for the relief of headache. About the third day he directed attention to what he called a pimple back of his left ear. A small papular, fluctuating swelling was found about 1 inch above the mastoid process which when punctured gave exit to a considerable discharge of laudable pus, the amount being out of all proportion to the size of the "pimple."

In reply to questions concerning a possible traumatism in this region he gave conflicting statements. He said he had been struck with a stick; that he had been shot with two pistol bullets. Upon the attending surgeon jokingly remarking that he must have been a skillful marksman who could make two bullets enter at one hole, the patient replied that the man was a crack shot, and that he had undoubtedly been struck by two different balls at the same spot. This is mentioned to show that his mentality, though disjointed and uncertain, was in a certain sense clear, and that he understood questions, which continued to be the case up to the day preceding his death. A probe inserted into the opening made by the bistoury impinged upon denuded bone, and, after careful manipulation, passed within the cavity of the skull to the depth of several inches without giving pain or producing any noticeable effect other than causing an increased discharge of pus. This procedure established the existence of an abscess of the left lobe of the cerebellum.

From this time until his death he remained in a semi-comatose condition with sensible intervals. He would comply with commands to protrude his tongue, move his head, raise his arm, etc., and had control over the sphincters of bladder and bowel. The propriety of trephining was considered, but as the existing opening seemed to be large enough to give free vent to the pus, and as the operation might have endangered the lateral sinus, it was not done.

The temperature remained at or near normal until the night of March 7, when it fell to 36°. On the morning of the 8th it had risen to 38.1° and he was in *articulo mortis* at the time of the attending surgeon's visit, and died shortly afterwards in coma.

Necropsy.—The membrane covering the posterior and inferior portions of the brain were congested; the ventricles were enlarged and contained an excess of fluid. The base of the brain was covered with pus between the pia and dura, probably due to a rupture of the sac containing pus, which was located in the upper anterior portion of the left lobe of the cerebellum. The abscess was about the size of an English walnut. In the lower occipital fossa on the right side of the skull a 32-caliber bullet was found firmly attached by bands of fibrous tissue to the dura mater and bone, the two latter being adherent at this point. The brain substance was adherent to the dura at the point of entrance of the ball (which was the point of discharge for the abscess), and also along the course of the superior longitudinal sinus. The brain substance in region of site of bullet had apparently been worn off by chafing against the roughened edges of the distorted bullet. The pathological specimens of this interesting case were removed by the coroner's physician, and according to a recent letter from him they have been mislaid and can not be returned, as requested, to this office.

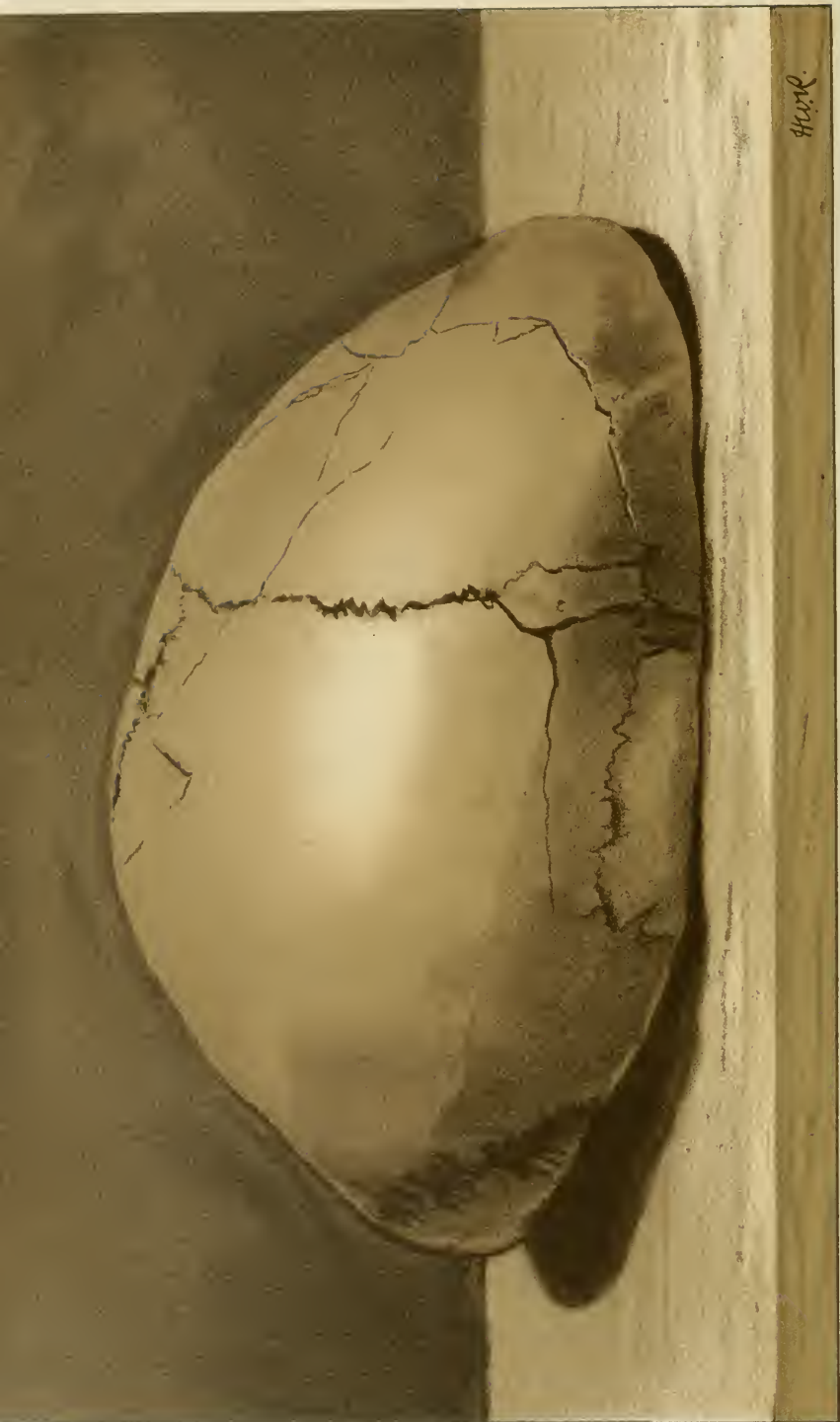
Remarks.—Subsequent to this patient's death the following information concerning his previous history was obtained from Acting Assistant Surgeon J. A. Dunwoody, Marine Hospital Service, Brunswick, Ga., and from a sister of the deceased, living at Charlestown, Mass. Dr. Dunwoody writes that "F. was sent from Darien, Ga., to Brunswick, Ga., November 15, 1888, suffering from a gunshot wound of the head. He stated to me that a party had shot him at Doboy, an island in the port of Darien. Upon his admission, which was about a week after the injury, I observed two openings, one at the tragus of the left ear, evidently where the ball entered, and another behind the ear in the mastoid portion. I probed the wound and found that the probe did not enter more than an inch inward and backward, and I naturally thought the opening behind the ear was the exit of the ball, for I could probe no deeper than 1 inch. I thought the ball struck the mastoid process and turned outward. I treated it antiseptically, and it healed gradually and he was discharged on December 8. But upon the next day he complained of intense pain down the course of both sciatic nerves, and was re-admitted December 9, and again discharged December 18. There were no symptoms that would indicate that the ball had entered the cranium, except that he would complain of dizziness from time to time, which entirely disappeared before he left the hospital. Nothing of special moment occurred during his entire treatment. After being discharged here he worked at various occupations for several days.

His sister, Mrs. Field, writing from Charlestown, Mass., March 16, 1889, furnishes the following additional information: "My brother thought that the ball passed in the ear passage and came out of that hole back of the ear, but we think that the hole back of the ear was where the ball went in and the powder went into the flesh in the ear. He said when he was shot he was senseless and blind for a month, from the concussion of the shot, and when he was here [date not given, but probably in January or February, 1889] he said his eyesight was not quite the same as before he was shot, and he had a numbness in his fingers and a bad feeling up the back of his head. When he was here he appeared wonderfully well for a man with a bullet in his head. He had a good appetite and walked every morning from here to Boston, looking for a place to ship. He shipped on a schooner that was wrecked off Minot's Light, and staid with a man on a raft a month."

His master's certificate, on which he was admitted for treatment February 25, shows that he was on the ship *Manuel Llaguno* from February 2 to February 14 as "seaman" with ability and seamanship marked "good," from which it is inferred that he performed his work satisfactorily. Inquiries made by the coroner at the sailors' boarding-house where he stayed from February 14 to February 25 seem to prove that he was at that time an apparently well man. He ate and drank well, was jovial, and out of the house the greater part of each day.

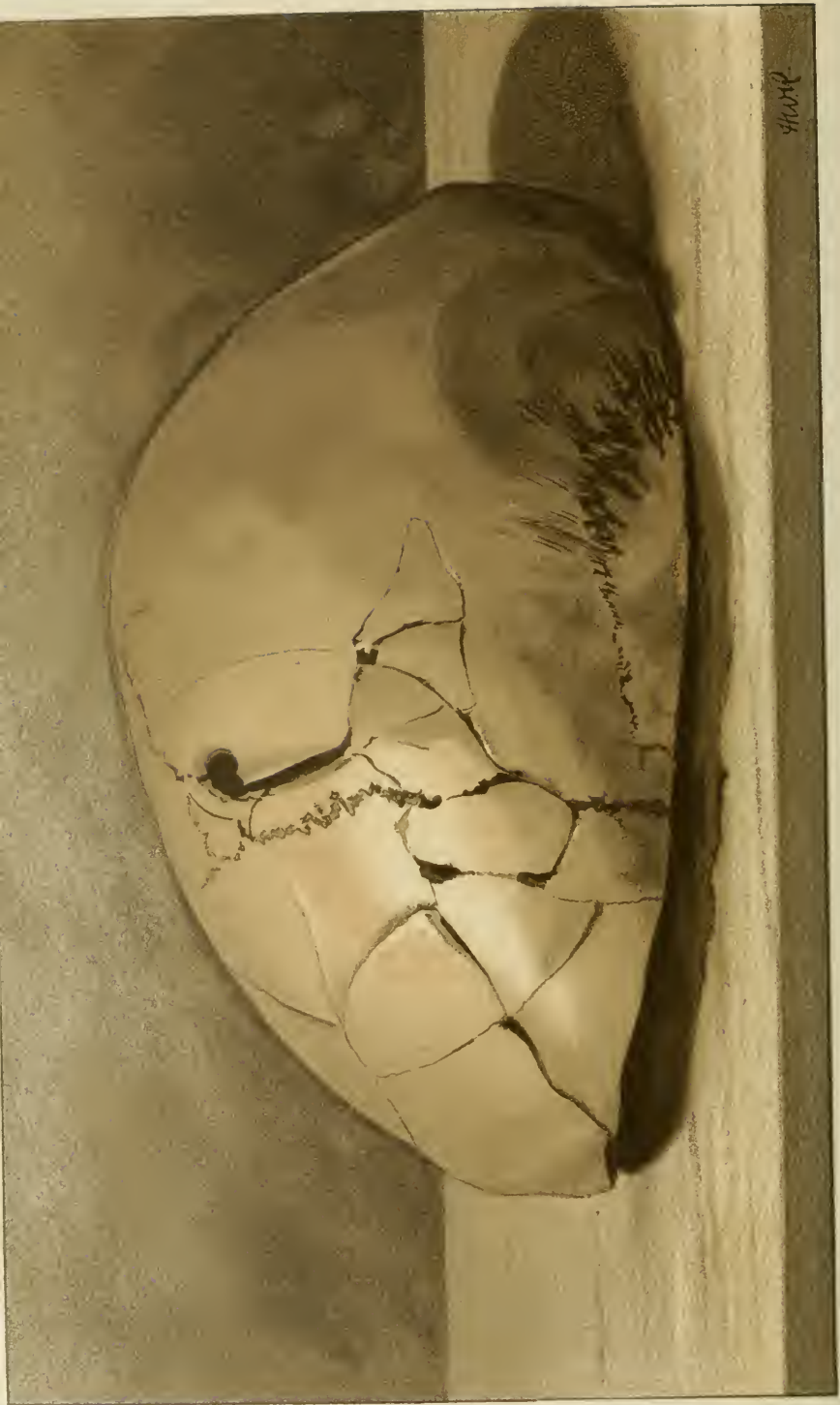
The deceased seaman's verbal statement on admission shows further that he was employed on schooner *Florence Randall* about fifteen days in latter part of December, 1888, or subsequent to his discharge from hospital at Brunswick, Ga.

This case is thought worthy of a detailed history, because of its intrinsic interest, and because of the almost total absence in surgical literature of records of autopsies in gunshot wounds of the cerebellum. It would seem to corroborate the conclusion heretofore advanced that injuries, tumors and abscesses of the cerebellum, are comparatively innocuous unless the middle lobe is affected, or pressure is produced resulting in dropsy of the ventricles.



H.M.R.

FRACTURES ON RIGHT SIDE OF VAULT.



44012

FRACTURES ON LEFT SIDE OF VAULT.

EXTENSIVE FRACTURE OF VAULT AND BASE OF SKULL.

By Assistant Surgeon H. T. GOODWIN.

O. H. (colored); aged thirty-eight; nativity, Virginia; occupation, roustabout; admitted to the U. S. Marine Hospital, Cincinnati, Ohio, February 19, 1889, about half past 10 o'clock in the morning, in an unconscious condition. The history given was to the effect that on the day previous he had an altercation with a fellow roustabout who struck him on the head with a capstan bar, the blow rendering him immediately unconscious.

Upon examination a contused wound about $3\frac{1}{2}$ centimeters in length was seen extending diagonally across the head over the left parietal bone about 1 centimeter to the left of the sagittal suture. The entire scalp was very œdematous, deep indentations of the fingers being left upon pressure. There was hemiplegia of the right side, while the left arm and leg were in constant motion. Both pupils were somewhat contracted and sensitive to light. Hemorrhage had taken place through the nose, as evidenced by coagulated blood adhering to the nares. Pulse, 56; temperature, 38; respiration, 25; no stertor. About 200 centimeters of urine were drawn off with the catheter, though there was evidence of some having been passed involuntarily. A diagnosis of fracture of the skull with compression being made, it was decided to cut through the scalp and fascia to see if there were any possibility of affording relief. A crucial incision over seat of injury revealed a stellate fracture of parietal bone with depression of two of the fragments, commencing about 1 centimeter to the left of the sagittal suture. A button of bone was removed with the trephine and these fragments elevated, but with little hope of benefit, as the fracture was found to extend in several directions beyond the incision in the scalp, and suspected to extend also to and through the anterior fossa. The wound in the scalp was thoroughly cleansed, a drainage-tube put in, dressed with iodoform, and an ice-bag applied to the head. One drop of croton oil with mucilage and spirits nitrosi was placed in the mouth, and instructions given to repeat it every hour till the bowels moved.

At 3 p. m. the pulse was 96; temperature, $39\frac{1}{2}$; respiration, 25; 6 p. m., pulse, 102; temperature, 39; respiration, 29.

February 20, 9 a. m., pulse, 135; temperature, $39\frac{3}{8}$; respiration, 60. Pupils do not respond to light. Involuntary evacuations of urine and feces. Ordered enemata of equal parts of concentrated beef tea and whisky every three hours. Noon, pulse, 135; respiration, 64; 6 p. m., temperature, $40\frac{1}{2}$; respiration, 62; pulse scarcely perceptible at the wrist—can not be counted.

Continued to sink, and died at 8.40 the same night—about fifty-seven hours after the injury was received.

Necropsy (fourteen hours after death).—Rigor mortis well marked; body well nourished; some hypostatic congestion posteriorly. Profuse extravasation of blood beneath the entire scalp, and external to periosteum. On removal of scalp the following condition appears: About 1 centimeter to the left of the sagittal suture and near the center of the parietal bone is a small opening made by trephine (on the 19th), radiating from which are four small fractures, three of which cross the sagittal suture to the right and diverge in their course, while the other passes about $2\frac{1}{2}$ centimeters to the left, where it divides into two, one passing forward and downward for a distance of about 2 centimeters where it intersects another. The other passes downward and backward, crossing a long curved fracture $2\frac{1}{2}$ centimeters from beginning, and continues $2\frac{1}{2}$ centimeters to a point near left parietal eminence. The long curved fracture begins at the point of fracture described above, and passes at first downward and backward and then upward and forward to the sagittal suture.

The fracture intersected begins at another fracture midway between the sagittal suture and temporal bone, passes down and slightly forward, and crosses the squamous suture into the temporal bone. In a part of its course it follows the course of the coronal suture. In addition to these there are eight fractures of various lengths in the frontal bone on left side, intersecting and crossing each other, and dividing the external table into as many fragments. One of these fractures cross the median line to the right side. One of these latter is described above as one of three radiating from trephine opening, and passing to the right. It courses downward and backward, intersecting a fracture and making an angle or curve just after the intersection very near the sagittal suture, from which point it continues $2\frac{1}{2}$ centimeters. The fracture intersected by the above runs $3\frac{1}{2}$ centimeters forward and downward and intersects a fracture at the coronal suture $2\frac{1}{2}$ centimeters from where sagittal suture intersects it. This coronal fracture follows its course on the right side, crosses the squamous suture, and passes to the temporal bone: just after entering which it is intersected by a fracture about 6 centimeters in length which runs downward and backward. The five fractures of the right side begin to the left of median line, and curving downward, outward, and backward, and then upward and forward, make a long curve over 8 centimeters in length. A majority of these fractures extend through the internal table. Three of the fragments on the left side, irregular in shape, and one on the right side near the median line and depressed, while a large fragment and smaller one on the right side are elevated.

On removing the calvarium, several of the fragments of which fell off after removal, a large diffused blood clot is found between the dura mater and skull, occupying the anterior half of the skull, and extending on the right side back to a point corresponding to the parietal eminence. On removing the brain the following fractures are found on the internal surface (the base). The fracture of the coronal suture on right side above described passes into the temporal bone and is continued on through the floor, passing through the anterior two-thirds of greater right wing of sphenoid bone, through the body of the sphenoid bone a little posterior to ethmoidal spine, through the lesser wing, and on through greater wing on left side where it divides; one passing backward and outward, and ending in petrous portion of left temporal bone. The outer part of left lesser wing of sphenoid bone is loose and easily removed. Another fracture begins where the above described fracture crosses the body of the sphenoid bone, and passes through the right lesser wing and into the right orbital plate of frontal bone. The dura mater is congested and all the vessels filled. On the inner surface of the dura mater along the sides of the falx cerebri are recent lymph deposits. The vessels of the arachnoid are very much congested, and on the superior surface near the longitudinal fissure between the two hemispheres are recent lymph deposits corresponding to those in dura mater. Beneath the arachnoid there is a diffused blood clot in the anterior portion of frontal lobe which dips down between the hemispheres and fills the spaces between the convolutions. On the left frontal lobe

just anterior to the fissure of Rolando is a blood clot $2\frac{1}{2}$ centimeters in diameter which dips into the brain substance to a point on a level with the corpus callosum. There is no effusion in any of the ventricles. The cerebellum is congested on its surface, but healthy and uninjured in its structure. Heart normal; adhesions of both pleuræ, and some effusion in left pleural cavity. Lungs healthy; liver normal in size and appearance. Spleen, kidneys, stomach, intestines, and bladder normal. The latter contains a small quantity of urine.*

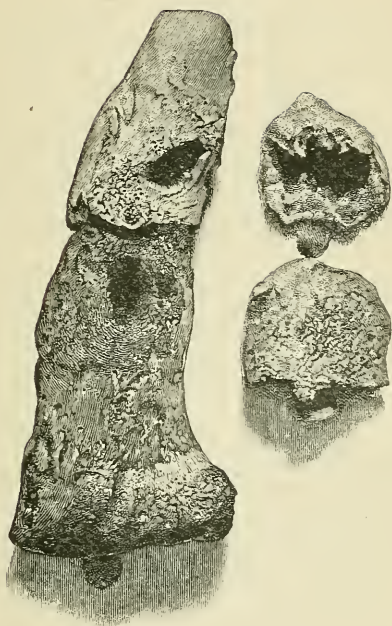
*The drawings accompanying this paper were made by Mr. H. W. Rowland, of Brooklyn, N. Y.

EXCISION OF LOWER END OF RADIUS AND ULNA, FOR AN OLD UNUNITED FRACTURE, FOLLOWED BY NECROSIS OF THE BONES.

By Surgeon H. W. AUSTIN, *U. S. Marine Hospital Service.*

F. J.; aged thirty one years; nativity, Canada; admitted to U. S. Marine Hospital, Chicago, Ill., November 13, 1888, with ununited fracture of the lower end of radius and ulna, with necrosis of both bones. The seat of fracture was about 2½ inches above the lower end of the ulna and radius, and was the result of a shot from a shotgun, received about ten years before. Two unsuccessful attempts at different times had been made to cause a union of the bones by wiring them together, and when the patient was admitted to the hospital both bones were wired, but bony union had not taken place and necrosis of both bones was the result. The tissues were infiltrated with pus and the patient was suffering from septic poisoning. November 17, 1888, ether was administered and two longitudinal incisions, about 3 inches long, made, one over the internal surface of the ulna and one over the external surface of the radius. Both bones were sawn through with a chain-saw, about 3½ inches from their lower ends; the entire lower fragment of the radius removed. The ulna was sawn through again just above its articular surface with the radius. The middle fragment removed, drainage was secured with braided catgut, an aseptic dressing applied, and the arm and hand bandaged to a wooden splint. There was scarcely any fever following the operation; the wound healed, and the patient's condition was greatly improved. Two weeks after the operation the wound over the radius reopened and a small spicula of bone and a loose pigeon-shot removed from the arm. Considerable fever, septic in character, followed, and the patient was confined to his bed for some time. The wound again closed after a few weeks. Small shot were removed from the arm at different times through the old wound, which finally closed. The patient suffered frequently from severe attacks of asthma, and once while in the hospital from pneumonia, followed by an abscess of the lung, from which he entirely recovered. A padded plaster bandage was applied to the wrist, after which he had moderate use of his hand. He could hold a book weighing a pound between thumb and fingers, knife or fork, or other light article, but the hand will not be useful for heavy work.

He was discharged from the hospital June 5, 1889, recovered. Accompanying this is an illustration from a photograph of bones removed.



BONES REMOVED FROM THE ARM OF FRANK JANNEY.

'To accompany report of Surgeon Austin.]

FLOATING CARTILAGE IN RIGHT KNEE-JOINT—HYDROPS—ARTHROTOMY—RECOVERY.

By Surgeon HENRY W. SAWTELLE, *U. S. Marine Hospital Service.*

Seaman L. P. O., a vigorous man; aged, thirty-four years; nativity, Sweden; was admitted to the U. S. Marine Hospital, San Francisco, Cal., March 21, 1889, and gave the following history:

About ten years ago he began to have slight pains in this knee upon going aloft, or when walking rapidly, and he was troubled with some swelling at times about the joint, especially after exposure in stormy weather. Last August (1888), upon walking quickly down-stairs, he was suddenly attacked with a sharp pain in the knee, and at the time he was unable to flex the leg. Upon examination he discovered a "hard lump" on the outer side, which disappeared into the joint cavity on rubbing the parts.

Thence forward he was disabled almost daily, or whenever the cartilage slipped to one or the other side. This caused him much pain, and the lesion rendered locomotion hazardous. On admission the joint was moderately distended with fluid.

March 22.—Joint aspirated; posterior splint applied to limb and patient ordered to remain quietly in bed for several days.

March 31.—Arthrotomy, the patient being under the influence of ether. The body was held in a fixed position by an assistant, the capsule opened, and the cartilage extracted with forceps. Upon inspection it was found to be irregular in form and about 1.5 centimeters by 0.5 centimeters in size. Antiseptic precautions were observed. A sublimate spray from a steam atomizer was thrown around the wound during the operation. The wound was closed with silk sutures and sublimate gauze applied, this was covered with oil silk and the limb confined to a posterior splint. Stitches removed.

April 4.—Wound healed by primary union; function of the knee joint perfect.

Discharged April 13, 1889.

A CASE OF SYPHILITIC DISEASE OF THE PONS VAROLII.

By Passed Assistant Surgeon S. T. ARMSTRONG, *U. S. Marine Hospital Service.*

In the annual report of the U. S. Marine Hospital Service for 1885 I reported a case of this disease in a male, aged twenty-eight. The following case presents features that make it worthy of record:

H. R.; aged, fifty-five years; a native of Ohio; was admitted to the U. S. Marine Hospital, Stapleton, N. Y., on the 23d of July, 1888. He claimed that he never had venereal disease until three weeks previous to his admission, when two sores appeared on the glans penis. They developed nine days after copulation, and were phagedenic. He had inguinal adenitis and syphilitic erythema. Treatment by iodide of mercury caused mercurialization in five days. August 15 he was discharged for out-treatment, the ulcers having healed.

He was re-admitted to the hospital on December 5, suffering with a papulo pustular syphilide on the legs, abdomen, and face, and a periostitis of the tibia. He was discharged, improved, on the 17th. He was again admitted January 19, 1889, stating that while sitting near a stove the preceding day he suddenly felt a singular sensation in his left side and found that he was paralyzed. The attack occurred shortly after he had eaten dinner; and though a hard drinker he denied having used whisky recently. There was complete left hemiplegia, the facial muscles being only moderately involved. A diagnosis was made of hemorrhage in right pons varolii.

January 21.—Breathing stertorous this morning; pulse, 92; temperature, 37° C.; he can not speak, though he comprehends what is said to him; difficulty in deglutition; involuntary micturition. He had been ordered increasing doses of iodide of potash when admitted, commencing with 1. gram t. i. d.

January 22.—Breathing still stertorous; condition good, and he attempts to respond to questions. Pupils equal. Pulse, 100; temperature, 37; p. m., pulse, 122; temperature, 39.8°. The progress of the case made the diagnosis doubtful, though the site of the lesion was still ascribed to the right pons. The interference with the left hemisphere, as evidenced by the lesion of the speech center, did not make the diagnosis clearer. Surgeon John Godfrey saw the case with me, and he made a diagnosis of pachymeningitis.

January 23.—Breathing quieter; pupils smaller; no recognition of his environment.

January 24.—Respiration difficult on account of pulmonary hypostasis. Died in the evening.

The necropsy was made twelve hours *post mortem*; *rigor mortis*. Livores on dependent portions of body. The pia mater of the left side about the fissure of Sylvius was cloudy, and the blood vessels were greatly congested; the meningitis was confined to the anterior and middle lobes. On section of the hemisphere the puncta vasculosa and choroid plexus were found congested. The right hemisphere was normal; two small cysts in the right choroid plexus. On section of the right pons varolii a spot

of softening was found, about its center, of a diameter of 1 centimeter. The lungs and heart were normal; traces of old aortitis. Liver cirrhotic; kidneys evidenced parenchymatous nephritis.

It seems improbable that a syphilitic process of six months should cause so severe a cerebral lesion, though the alcoholism (evidenced by the aortitis, the condition of the liver and kidneys) may have laid the foundation. There was no gross lesion of the vessels about the pons. The cause of the pachymeningitis is unknown; still it is probable that it was incited by the inflammation of the minute cerebral arteries that is found at the basis of most cerebral syphilitic affections.

REPORT OF SURGICAL OPERATIONS.

REPORT OF SURGICAL OPERATIONS.

FISCAL YEAR, 1889.

Operations.	No. of cases.	Remarks.
Total number of operations.....	691	
REMOVAL OF TUMORS.....	33	
For sebaceous cyst.....	13	Excision.
For cyst of neck.....	2	do.
For cyst of penis.....	1	do.
For keloid of neck.....	1	do.
For lipoma of eyelid.....	1	do.
For lipoma of neck.....	1	do.
For lipoma of back.....	5	do.
For lipoma of thigh.....	1	do.
For angioma of nates.....	1	Cautery, actual.
For papilloma of penis.....	1	Excision.
For adenoma of neck.....	1	do.
For sarcoma of groin.....	1	do.
For epithelioma of lip.....	1	do.
For carcinoma of larynx.....	1	Tracheotomy; died.
For carcinoma of rectum.....	1	Dilatation and incision; died.
For non-malignant growth of naso-pharynx.....	1	Excision after laryngotomy; died.
REMOVAL OF FOREIGN BODIES.....	6	
For gunshot wound of arm.....	1	Bullet removed.
For gunshot wound of thigh, old.....	1	Bullet removed; encysted.
For needle in the arm.....	1	Needle removed.
For fishhook in the hand.....	2	Removed, 2.
For splinter in the hand.....	1	Removed.
OPENING OF ABSCESSSES.....	27	
For abscess of neck.....	2	
For abscess of axilla.....	1	
For abscess of arm.....	2	
For abscess of forearm.....	3	
For abscess of hand.....	5	
For abscess of groin.....	1	
For abscess of buttock.....	2	
For abscess of perineum.....	1	
For abscess of penis.....	3	
For abscess of epididymis.....	1	
For abscess of leg.....	1	
For abscess of liver.....	3	Incised, 2; aspirated, 1; died, 1.
For perityphlitic abscess.....	1	Incised and drained.
For psoas abscess.....	1	Incised, irrigated; died.
OPERATIONS ON NERVES.....	2	
For neuralgia, sciatica.....	1	Nerve stretched.
For compression, ulnar nerve.....	1	Portion of nerve excised.
OPERATIONS ON THE EYE AND APPENDAGES.....	25	
For entropion.....	3	Cilia removed by the knife.
For pterygium.....	4	Excision.
For foreign body in conjunctiva.....	2	Removed.
For foreign body in cornea.....	2	do.
For occlusion of pupil.....	1	Iridectomy.
For lacerated wound of cornea.....	1	Enucleation.
For lead deposit on cornea.....	1	Deposit removed.
For glaucoma.....	2	Iridectomy, 2.
For staphyloma.....	1	Enucleation.
For abscess of eyelid.....	1	Incision.
For chalazion.....	3	Excision.
For lachrymal stricture.....	3	Duct dilated, 3.
For dacryo cystitis.....	1	Bowman's operation.
OPERATIONS ON THE NOSE.....	3	
For polypus.....	2	Removed; snare, 1; torsion, 1.
For nasal catarrh.....	1	Galvano-cautery.

Report of surgical operations—Continued.

Operations.	No. of cases.	Remarks.
OPERATIONS ON THE HEAD	5	
For fracture of the skull, depressed..	3	Trephined, 2; died, 2; recovered, 1.
For necrosis of frontal bone	1	Necrosed bone removed.
For wound of ear	1	Sutured.
OPERATIONS ON THE FACE AND MOUTH	7	
For removal of tonsils	1	Excision.
For caries of dentine	2	Extraction.
For necrosis of lachrymal bone	1	Necrosed bones removed.
For wound of tongue, old	1	Edges freshened and sutured.
For wound of face, gunshot	1	Dressed.
For wound of chin and neck	1	Died from hemorrhage from vertebral artery.
OPERATIONS ON THE VERTEBRAL COLUMN	1	
For fracture of vertebrae	1	Resection of 12th dorsal and 1st and 2d lumbar; died; septicæmia.
OPERATIONS ON THE ARTERIES	4	
For aneurysm of temporal artery	1	Ligation.
For aneurysm, right common carotid ..	1	Ligation, common, carotid; proximal side of tumor.
For aneurysm femoral artery	1	Ligation, external iliac; died.
For aneurysm, popliteal artery	1	Compression; successful.
OPERATIONS ON THE VEINS	3	
For varicose veins of leg	3	Compression, 3; successful, 2.
OPERATIONS ON THE RESPIRATORY ORGANS	9	
For hydrothorax	3	1 aspiration; 2 incision and drainage; 1 died; cause of death, carcinoma.
Empyema	4	Paracentesis, 4; died 1.
For hæmothorax	1	Aspiration; successful.
For œdema of glottis	1	Laryngotomy; died.
OPERATIONS ON THE DIGESTIVE ORGANS	82	
For acute inflammation of liver	1	Aspirated; died.
For cirrhosis of liver	2	Tapped, 2; died, 2.
For hernia, strangulated	1	Died.
For hernia, radical cure	17	Successful, 16; improved, 1.
For obstruction of bowel by peritoneal adhesion	1	Laparotomy; successful.
For stricture of rectum	1	Dilated; successful.
For prolapse of rectum	4	Resection, 4.
For foreign body in rectum	1	Removed.
For ulceration of rectum	1	Dilatation and cantery.
For fissure in ano	6	Dilatation, 5; cantery, 1.
For fistula in ano	20	Incised, 19; scraped, 1.
For hemorrhoids	24	Ligation 16; excision, 4; cantery, 2.
For ascites	3	Aspirated, 3; improved, 1; not improved, 2.
OPERATIONS ON THE LYMPHATIC GLANDS	56	
For suppuration of lymph glands	12	Incised, 12; cauterized, 1.
For removal of diseased lymph glands ..	44	Excision.
OPERATIONS ON THE URINARY ORGANS	129	
For chronic nephritis	1	Paracentesis; successful.
For vesical calculus	1	Suprapubic lithotomy; successful.
For urethral calculus	1	Perineal section; successful.
For stricture of the urethra:		
(a) Gradual dilatation	41	
(b) Forcible dilatation	33	
(c) Internal urethrotomy	40	
(d) External urethrotomy	2	Died, 1; pyæmia.
(e) Perineal section	2	Died, 1.
For urinary fistula	4	Int. urethrotomy, 3; external, 1.
For laceration of urethra	1	Ext. urethrotomy without a guide; died.
For chronic cystitis	1	Suprapubic cystotomy; much improved.
For cystic hæmaturia	2	Suprapubic cystotomy; died, 1.
OPERATIONS ON THE GENERATIVE ORGANS	137	
For phimosis	79	Slitting, 13; circumcision, 16.
For paraphimosis	7	Incision, 1; reduction and circumcision, 6.
For hydrocele of tunica vaginalis	32	Radical cure.
For hydrocele of cord	3	Do.
For varicocele	3	Ligation, 2.
For contracted frænum	2	Division.
For ulcer of prepuce	1	Circumcision.
For phagedenic ulcer of penis	1	Excision of part of glans and prepuce.
For gangrene of penis	1	Excision of gangrenous portion.

Report of surgical operations—Continued.

Operations.	No. of cases.	Remarks.
OPERATIONS ON THE GENERATIVE ORGANS—		
Continued.		
For carcinoma of penis	2	Amputation.
For chronic orchitis	2	Castration.
For syphilitic disease of testicle	1	Do.
For tubercular disease of testicle	2	Do.
For sarcoma of testicle	1	Do.
OPERATIONS ON THE ORGANS OF LOCOMOTION		
On bones	102	
For fracture inferior maxilla, comp.	40	
For fracture of humerus	1	Wired; non-union.
For fracture of radius	1	Reduced.
For fracture of phalanx of hand, comp.	1	Do.
For fracture of metacarpal bone	1	Do.
For fracture of pelvis bilateral	1	Died.
For fracture of femur	1	Reduced.
For fracture of femur, comp. comm.	1	Knee-joint involved; amputated; died.
For fracture of tibia	1	Reduced.
For fracture of fibula	1	Do.
For comp. comm. fracture both bones of leg	1	Ends of bones resected, and wired.
For fracture of phalanx of toe	1	Bone removed.
For caries of femur	1	Bone scraped.
For caries of tibia	4	Do.
For caries of fibula	1	Do.
For caries of astragalus	1	Do.
For caries of os calcis	1	Do.
For necrosis of frontal bone	1	Necrosed bone removed.
For necrosis of malar bone	1	Do.
For necrosis of humerus	2	Do.
For necrosis of olecranon	1	Resection.
For necrosis of femur	3	Necrosed bone removed.
For necrosis of tibia	11	Do.
For necrosis of metacarpal bone	1	Do.
On joints	60	
Sprain of knee	2	Aspirated, 2.
Reduction of dislocations	17	
Jaw	1	Manipulation.
Shoulder	12	Successful, 11; unsuccessful, 1 (old).
Clavicle, sternal end	1	Manipulation.
Elbow	2	Do.
Interphalangeal	1	Do.
For ankylosis, hip	1	Adhesions broken up by manipulation.
For ankylosis, knee	1	Do.
For acute synovitis, knee joint	7	Aspirated.
For chronic synovitis, knee joint	12	11 aspirated; 1 excised, recovered.
For bursal inflammation	16	Aspirated, 13; incision, 1; excision 1.
For hematoma of knee	1	Aspirated.
For bunion	3	Head metatarsal bone excised, 3.
OPERATIONS ON TENDONS		
For wryneck	2	
For deformity of toe	1	Tenotomy; much improved.
	1	Tenotomy; successful.
AMPUTATIONS		
Fingers for contracted tendon	47	
Fingers for whitlow	3	
Fingers for necrosis	4	
Fingers for gangrene	7	
Fingers for caries	2	
Fingers for compound fracture	3	
Fingers for lacerated wound	3	
Fingers for gunshot wound	5	
Fingers for fungoid granulation of stump	2	
Arm for osteo myelitis	1	Re-amputation.
Arm for scirrhus of forearm	1	
At the shoulder-joint, crushed under car-wheel	1	Portion of acromion and spinous process also removed.
Toes for frost-bite	2	
Toes for necrosis	3	
Toes for wound	1	
Toes for caries	1	
Foot for fracture of tarsal bones	1	
Leg for gangrene	1	Re-amputated; recovered.
Leg for comp. comm. fracture	1	
Thigh for comp. comm. fracture of leg, both bones	1	Died.

Report of surgical operations—Continued.

Operations.	No. of cases.	Remarks.
AMPUTATIONS—Continued.		
Thigh for comp. comm. fracture.....	1	
Thigh for gangrene.....	1	
At hip-joint for round celled sarcoma..	1	Died.
OPERATIONS ON THE SKIN		
For chronic ulcer.....	10	
For burn of leg.....	2	Skin grafting.
For ingrowing nail.....	1	Do.
For boils.....	3	Avulsion.
For lupus ulcer.....	1	Acid, carbolic, injected.
For irritable stump of thumb.....	1	Diseased tissue removed; successful.
For cicatrix on forehead.....	1	Cicatrix excised.
UNCLASSIFIED		
For wound of abdomen with protrusion of unwounded viscus	3	
For wound of side, incised.....	2	Gut replaced; wound sutured; successful, 2.
	1	Wound sutured; successful.

REPORTS OF FATAL CASES, WITH NECROPSIES.

REPORTS OF FATAL CASES, WITH NECROPSIES.

ENTERIC FEVER.

CASE 1.

J. N.; aged twenty-three years; native of Massachusetts; was admitted to the U. S. Marine Hospital at Chelsea June 13, 1889; died June 30.

History.—Patient on admission was in the first week of enteric fever. The disease progressed steadily, with profound nervous symptoms; delirium of low, muttering character, picking at the bed-clothes, and unconscious discharge of fæces; bronchitis developed, leading to congestion, hypostatic pneumonia, and death from asthenia.

Necropsy.—No *rigor mortis*; body well nourished; hypostatic congestion of all dependent parts; large ulcer on sacrum, 8 by 5 centimeters, and a smaller on the left trochanter; slight excess of pericardial fluid. Heart weighed 360 grams, contained no clots, and was normal in all respects with the exception of slight hypertrophy. Lungs more or less congested throughout; right weighed 460 grams, and showed a dark streak about $2\frac{1}{2}$ or 3 centimeters wide extending the whole length of the posterior surface. On section this streak was found to be the seat of consolidation, apparently due to collapse of the pulmonary lobules (hypostatic pneumonia). Left lung weighed 440 grams. Pleuritic adhesions of both lungs, more marked on the right side. Liver weighed 2,000 grams; slight congestion of the left lobe, which was unusually elongated, giving it a tongue-like shape. Spleen weighed 290 grams, and was enlarged and congested. Right kidney weighed 180 grams; left, 167 grams; capsules not adherent. On section both found intensely congested, but no hemorrhages were observed. About 200 cubic centimeters of pale serum in peritoneal cavity; mesenteric glands much enlarged; ileum and large intestine to the rectum congested and occasionally inflamed, more marked in the lower part of the ileum; colon distended with gas. On slitting up the intestine numerous ulcers of the solitary glands, in size from one-half to 2 centimeters in diameter, usually round, occasionally oval in shape, was found in the lower 35 centimeters of the ileum and the first 15 centimeters of the colon, including the cæcum, being more numerous in the latter. Only one Peyer's patch was found affected, and that was in the lower ileum, and about 4 by 2 centimeters in size. Many ulcers extended through the intestinal coats to the peritoneum; others contained sloughs not yet detached, but there was no perforation nor peritonitis.

CASE 2.

J. A. B.; aged eighteen years; native of Utah; was admitted to U. S. Marine Hospital at Chelsea, Mass., March 28, 1889; died April 1.

History.—On admission the patient could give no lucid account of his sickness. Temperature was 40° C. in the axilla, the tongue was dry and parched, the urine was retained, and the fæcea passed unconsciously. Stimulants were administered freely, but to no purpose; the pulse became rapid and irregular, and death occurred from heart failure.

Necropsy (seven hours after death).—Cadaveric rigidity established; body well nourished. Hypostatic congestion of all dependent parts. The heart was found hypertrophied; aortic valves thickened; right ventricle contained *ante-mortem* clots; weight of heart 310 grams. Left lung weighed 320 grams and was normal. Right

lung weighed 605 grams; lower back part of lowest lobe was the seat of red hepaticization. Spleen enlarged, congested, and weighed 280 grams. On opening the abdomen no signs of peritonitis were seen. The mesenteric glands were enlarged. The lower ileum contained numerous swollen Peyer's patches and solitary glands, but none were ulcerated. Near ileo-caecal valve the entire mucous membrane of the ileum was intensely inflamed. An incipient intussusception was observed in the ileum, about 3 centimeters being invaginated without adhesion.

CASE 3.

B. O.; aged twenty-four years; native of Norway; admitted to U. S. Marine Hospital at Chelsea, Mass., November 20, 1888; died December 13.

History.—Taken, three or four days before admission, with chill; had several every day, with some sweating, slight cough, and vomiting. Some epistaxis; no diarrhoea; bowels acted normally; no soreness nor eruption of abdomen. From these symptoms remittent fever was suspected, but in a few days diarrhoea, tenderness, and tympanites of abdomen, rose spots, and nervous symptoms, with range of temperature, clearly indicated typhoid fever. On the 12th patient was much better; next morning temperature was 37.2°, but while sitting up at stool that night he suddenly cried out and fell back dead.

Autopsy (ten hours after death).—*Rigor mortis* well marked; body well nourished; lungs congested; right, weighed 630 grams; left, 520 grams. Heart weighed 390 grams; slightly enlarged; considerable deposit of fat around it: contained large quantity of dark blood. Liver enlarged and congested; weight 2,520 grams. Spleen enlarged and congested; weight 385 grams. Kidneys enlarged and pale; right weighed 240 grams, left 253 grams. Peyer's patches ulcerated in ten or twelve places; slight peritonitis. Paralysis of heart caused death.

CASE 4.

W. W. (colored); age, fifty-three; nativity, Michigan; admitted to U. S. Marine Hospital, Detroit, Mich., April 15, 1889; died May 12, 1889.

History.—Patient had been sick three weeks before admission with a cough, diarrhoea, and fever. The temperature was not high after the first few days, but he grew gradually weaker, dying of exhaustion.

Autopsy (six hours after death).—Body much emaciated; *rigor mortis* marked; heart normal; organized clots in all the cavities; pleuritic adhesion on both sides, binding portions of lungs firmly to chest-walls. Hypostatic congestion of lungs posteriorly. Spleen normal; weight 160 grams. Liver also normal in size; weight 1,665 grams. Dark-colored, mulberry-like concretions, weighing 1.66 grams, were found in the gall-bladder. Peyer's patches were ulcerated in the 2 feet of the ileum nearest the caecum, the largest and deepest ulceration being near the valve. Omentum thickened and congested, its lymph-glands much enlarged.

CASE 5.

Lobar pneumonia and peritonitis.

M. S.; age, forty-nine; nativity, Mississippi (colored); admitted to U. S. Marine Hospital, Detroit, Mich., August 7, 1888; died August 11, 1888.

History.—He entered the hospital July 30, with lobar pneumonia, presenting the usual symptoms of that disease—rapid and shallow, gasping respiration; cough, with blood-streaked sputa; pain in chest, and fever, with physical signs of consolidation. Later, his continued high temperature, diarrhoea, swollen and tender abdomen seemed to indicate the coexistence of enteric fever.

Necropsy (ten hours after death).—Right lung showed posteriorly signs of gray hepaticization, and portions of its tissue sunk in water. Some pleuritic adhesions on

both sides. Right lung weighed 1,350 grams; left, but 690 grams; heart valves normal; organized clot in left ventricle; kidneys normal; liver and spleen somewhat congested. Weight of liver, 2,050 grams; of spleen, 290 grams; lymph deposits and adhesions gave evidence of peritoneal inflammation. Careful examination revealed no evidence of lesions in Peyer's patches or mesenteric glands.

CASE 6.

W. J.; aged twenty-five years; nativity, Virginia; admitted to marine ward, German Hospital, Philadelphia, Pa., July 25, 1888; died August 8, 1888.

History.—On admission he was supposed to have, from his statement, malarial intermittent fever of about two weeks' duration. Subsequently his diagnosis was changed to enteric fever. His temperature was from the first high and unvarying, remaining at or near 40° C. The apex of the left lung was dull on percussion, and was accompanied with bronchial breathing; but there was very little cough or expectoration. Hemorrhage from the bowels was frequent and profuse, and just before death he saturated the mattress with blood. He was delirious for several days, and during his entire illness suffered from a peculiar nervous tremor of body and limbs. Death occurred at midnight, August 8.

Necropsy (eleven hours after death).—Body emaciated. *Rigor mortis* present. The left lung contained a large cavity at the apex, the wall of which was firmly attached to the thorax. The right lung and heart were normal. The abdominal organs were healthy except the intestinal tract. The ileum and colon were greatly congested. In the lower portion of the former four large ulcers were observed, ulceration of which had destroyed the mucous coat. There was no perforation. The immediate cause of death was exhaustion from intestinal hemorrhage.

CASE 7.

Z. W.; aged twenty-three; born in Maine; was admitted to the U. S. Marine Hospital, Vineyard Haven, Mass., November 18, and died November 24, 1888.

History.—The patient was brought to the hospital in the ambulance in an unconscious condition. His past history could not be obtained. He was found to be suffering from enteric fever in the second rank. At the time of admission there were present low muttering delirium; pulse, 120; respiration, 25; marked sudor; diarrhœa, stools of a yellow ochre color; gurgling on pressure in the right iliac region, with tenderness, peritonitis, accompanied by tympanitis; a few lenticular rose-colored spots were observed scattered over the abdomen; spleen somewhat enlarged. He was at once placed upon decided doses of stimulant and digitalis, and the usual medication and dietetics of an advanced case of typhoid adopted. No intestinal hemorrhage took place. The case gradually became worse and death ensued on the sixth day after admission. The remains were removed by relatives and an autopsy could not be obtained. Medication produced no apparent effect.

The recorded temperature was as follows:

	7 a. m.	12 m.	6 p. m.		7 a. m.	12 m.	6 p. m.
	°	°	°		°	°	°
Nov. 18		38.3	38.3	Nov. 22	37.4	38.3	37.2
19	38	38	38.1	23	39	38.4	39
20	38.2	38.2	38.2	24	38.1	died.	....
21	37.4	37.4	38.1				

CASE 8.

Pneumonia and acute nephritis.

M. T.; aged twenty-four: born in Maine; was admitted to the U. S. Marine Hospital at Vineyard Haven, Mass., November 12, 1888 and died November 20.

History.—The patient came to receive office treatment, thinking his case very light. He had been feeling unwell for a week or ten days, a slight chill being the initiatory symptom. Then followed languor and loss of appetite. He was found to have the usual symptoms of a case of walking typhoid, with kidney and pulmonary complications, albumen in the urine, and pneumonia confined to the lower right lobe.

The following is the temperature record till the evening preceding his death.

	7 a. m.	12 m.	6 p. m.		7 a. m.	12 m.	9 p. m.
	°	°	°		°	°	°
Nov. 12.....			39	Nov. 16.....	38.3	38.2	39
13.....	38.2	38	38.4	17.....	38.2	38.2	39
14.....	38.2	38.2	39	18.....	40	38.1	39.2
15.....	38.2	37.4	39	19.....	38.3	39.1	37.4

No eruption was observed; diarrhœa, three stools in the twenty-four hours; no tympanitis intestinal hemorrhage, perforation, or peritonitis occurred; spleen slightly enlarged; low muttering delirium during the last three days; collapse set in during the afternoon of November 19, and he died on the morning of the ninth day after his admission. The usual treatment for enteric fever was followed with additions necessary to meet the complications.

Necropsy (twelve hours after death).—Complete *rigor mortis*; body well nourished; right lung congested and solidified in the lower lobe; pericarditis; cardiac muscle soft; recent pleuritic adhesions on both sides. The cavities of the heart contained *ante-mortem* clots. Liver enlarged, soft and fatty; weight, 2,496 grams. Gall-bladder distended. Spleen greatly enlarged and congested; weight, 736 grams, and its surface covered with cicatricial scars. Kidneys enlarged, congested; capsule adherent. Many urinary cysts were found upon the surface and evidences of a long standing chronic inflammation were present.

Intestines: On examining the small intestines the Peyerian and solitary glands were found to be greatly diseased. Those nearest the cæcum were in a state of ulceration. Some were thick, indurated, and presented a granulated aspect. Others had sloughed away with portions of the surrounding mucous membrane. In some the slough was still attached and of a yellow hue. The mesenteric glands were greatly enlarged and two were found connected into a sac of pus. Many of them were as large as a hen's egg, hard and indurated. No hemorrhage had occurred from the diseased surfaces.

CASE 9.

A. G.; aged twenty-six; nativity, Sweden; admitted to U. S. Quarantine Hospital, Sapelo, Ga., October 12, suffering from enteric fever.

History.—Patient was in a state of collapse when admitted, but rallied somewhat after being put to bed. Diarrhœa, to the extent of six or eight stools during the day, was partially held in check by argenti nitras, gm. .01, and pulv. opii., gm. .07, in pill. After second day, however, patient began to decline again, and on October 19, at 6 p. m., expired.

Necropsy.—Showed very little emaciation or *rigor mortis*. Organs of chest in apparently normal condition. Upon opening intestines lower .5 meter of ileum highly congested and in two spots only peritoneum remained intact, the remaining coats being destroyed by ulceration. These spots were, respectively, about 1.5 and 1 centimeter in diameter.

CASE 10.

W. B.; aged twenty-three; nativity, Alabama; admitted to Marine Hospital, Cincinnati, Ohio, August 18, 1888; died August 25, 1888.

Necropsy (twelve hours after death).—Body well nourished, and that of a powerfully built man. Body warm in axillary region. *Rigor mortis* not well marked. Abdomen distended. Pericardium pale, and contains 60 cubic centimeters of serous fluid. Heart normal in size, and pushed upward by diaphragm, upon which it lies horizontally, with its long axis at right angles to the long axis of the body, its apex pointing directly to the left. Posterior coronary vessels distended with blood. Both ventricles filled with *post-mortem* clots; valves normal. Lungs normal, but firm adhesions over right posteriorly. Peritoneum distended with gas. Diaphragm pushed far up into thorax. Stomach hyperæmic, and filled with fluid. The fluid is watery and of a bluish-black color. Pyloric orifice plugged with a moderately firm white substance, which upon being crumbled between the fingers has the appearance of cottage cheese. Lining membrane hyperæmic and a circular patch about 2 decimeters in circumference near cardiac orifice intensely inflamed, on which there are a few drops of pus. Liver somewhat soft; weight, 2,496 grams; three small cysts on under surface of right lobe. Spleen dark red; capsule easily detached; weight, 272 grams. Kidneys normal. Mesentery inflamed, and glands enlarged. Intestines distended with gas, and both large and small contain a bright yellow fæcal fluid. Glands of ileum enlarged, and lining membrane inflamed.

CASE 11.

Edema of the glottis.

G. B.; aged twenty-six years; nativity, America; admitted to U. S. Marine Hospital, Cleveland, Ohio, June 4, 1889; died June 11, 1889.

History.—Patient stated that he had been sick four weeks. He was taken sick with a "hard cold" on May 6 on board of a disabled vessel which had not touched at any port where there was marine hospital relief until he arrived at Cleveland on June 3. Patient had consequently remained on board with absolutely no medicine or medical attendance. He had not done any work because he was not able, and had been confined to his bed. In reply to the question as to what had been his diet, he said he had eaten nothing. Mode of onset was gradual, and no initial chill. During these four weeks of sickness, previous to his admission to hospital, he had had fever, anorexia, epistaxis, diarrhœa, and intestinal hemorrhage. On admission his countenance and general aspect were characteristic of severe enteric fever. There were rose-colored spots on abdomen and chest, diarrhœa, intestinal hemorrhage, tympanitis, enlargement of spleen, and a dry, dark dirty tongue, heavily coated; pulse, 96; temperature, a. m., 40° C.; p. m., 40.6°; pulse, 100.

June 5.—Temperature, a. m., 39.4°; pulse, 94; temperature, p. m., 39.4°; pulse, 96; active delirium all the preceding night. Diarrhœa continued until he died, the bowels moving from four to seven times every twenty-four hours.

June 6.—Temperature, a. m., 39.6° C.; pulse, 96; temperature, p. m., 39.4°; pulse, 96; active delirium at night.

June 7.—Temperature, a. m., 38.9°; pulse, 100; temperature, p. m., 38.3°; pulse, 96; epistaxis; intestinal hemorrhage.

June 8.—Temperature, a. m., 36.1; pulse, 88; temperature, p. m., 37.7°; pulse, 96; retention of urine.

June 9.—Temperature, a. m., 38°; pulse, 92; temperature, p. m., 39.6°; pulse, 100; tympanites and general condition improved. Delirium at night continued.

June 10.—Temperature, a. m., 37.2°; pulse, 96; temperature, p. m., 39.7°; pulse, 100. Case apparently progressing favorably, but patient very weak.

June 11.—The patient had previously made no complaint of any sore throat, or of any difficulty in breathing or swallowing nor were there any signs or symptoms indi-

cating any trouble in that locality. Early in the morning of June 11 the patient complained for the first time that it was difficult for him to breathe. An examination disclosed the fact that the labored breathing was due to obstruction in the larynx, and soon the symptoms became very urgent. The diagnosis of œdema of the glottis was made. Death from asphyxia being imminent, laryngotomy was performed. The operation gave relief to the distressing dyspnoea, and the patient rallied for a short time; but his exhaustion was so great after the long continued fever followed by the above complications that he soon expired.

Necropsy (six hours after death).—There were three small ulcers, the size of a split kernel of wheat, on the posterior surface of the epiglottis. There was a serous effusion into the connective tissue of the larynx above the vocal cords; the swelling involved both sides of the larynx, and the base of the epiglottis. The immediate cause of death was œdema of the glottis. Lungs were normal, except some hypostatic congestion. Heart and liver normal. Kidneys enlarged, but otherwise normal. Spleen very much enlarged, very much congested, and almost as soft as pulp. Mesenteric glands enlarged. No ulcers were found in the cæcum, but commencing with the ileo-cæcal valve and extending up the ileum were many small ulcers, being more numerous in the lower part of the ileum. These ulcers were elliptical in shape, and their long diameters were parallel to the intestine. They had a punched out appearance, and the margins of the ulcers were undermined, and the muscular tissue was exposed at the bottom of the ulcers. The contents of the intestines were very dark from the admixture with blood. There was no perforation of intestines or peritonitis in this case.

CASE 12.

J. H.; colored; aged nineteen: native of Tennessee; admitted to U. S. Marine Hospital, New Orleans, La., January 17, 1889; died January 23, 1889.

History.—Patient gave a history of a syphilitic sore; and an eruption of the second stage of that disease was visible upon the skin. During the few days before admission to hospital he complained of headache, pain in the back, and slight chilliness. When admitted his temperature was slightly above normal, pulse good; no vomiting, slight diarrhœa. The patient's general condition was good, and he was not confined to his bed. The case was diagnosed as secondary syphilis. During the following few days, however, the fever rose steadily, reaching 40° C. and over at the evening exacerbation. The patient's condition became critical. The pulse was rapid and dicrotic, tongue heavily coated and cracked, bowels loose, and nervous symptoms marked. Malarial remittent fever was suspected, and the following line of treatment ordered: 15 c. c. whisky, and gr. x tr. digitalis every two hours. Sulphate of quinine, .3 gm. three times a day, and antipyrin to reduce hyperpyrexia. He was put on milk diet. There was no diminution, however, in the severity of the symptoms, and he gradually became worse, and died January 23, 1889.

Necropsy (twelve hours after death).—External appearances: Body that of a medium sized man, colored.

Rigor mortis present. A papular eruption visible on skin of arms and legs.

Thoracic cavity: Lungs, mucus membrane of bronchial tubes inflamed. Hypostatic congestion visible at posterior of lower lobes. Heart and pericardium normal.

Abdominal cavity: Peritoneum covering intestines very much injected. On opening the intestinal canal the typical lesions of typhoid fever were found extensively distributed both in the large and small intestines. Peyer's patches were everywhere inflamed, swollen, and in some places slightly ulcerated. By far the greater number, however, were in the stage of medullary infiltration. The mucus membrane surrounding the patches was congested. The solitary glands throughout the small and large intestine were inflamed and infiltrated and in some cases the process had advanced to ulceration. They were frequently found elevated over 2 millimeters above the surrounding surface. Liver slightly enlarged. Spleen enlarged and congested. Kidneys congested. Brain not examined.

CASE 13.

N. E.; aged twenty-two; nativity, Norway; admitted to U. S. Marine Hospital, Chicago, Ill., August 16, 1888; died September 16, 1888.

History.—Irregularly chilly sensations August 6; severe frontal headache same date. Diarrhœa commenced two days later; stools eight to ten every twenty-four hours previous to admission to hospital; characteristic yellow and watery. Frequent attacks of epistaxis. Four times he was attacked with hæmatemesis.

Necropsy.—*Rigor mortis* well marked. Some emaciation. Nostrils lined with crusts of dried blood. Upon opening abdominal cavity some offensive smelling gas escaped. Vessels of peritoneum were greatly engorged, and numerous flakes of lymph were deposited over its surface in right hypochondriac and lumbar regions. Small intestines were all agglutinated by the deposition of inflammatory lymph; great care and considerable force had to be used in separating the coils from one another. Abdominal cavity contained about 500 cubic centimeters of dark-colored serous fluid. Mesentery showed evidences of a recent intense inflammatory process, its vessels being injected, and flakes of yellowish lymph appearing on its surface. The lymphatic glands of the mesentery were greatly enlarged. Careful examination revealed no evidence of ulceration in any of them. Small intestines were removed, opened, and washed free of their contents. The ileum was the seat of intense inflammation and ulceration, displaying the characteristic lesions of this disease. Fully sixteen large characteristic typhoid ulcers were found, one perforating all the coats of the intestines, about 1 meter from the ileo-cæcal valve. The perforating ulcer was about 1.5 millimeters in diameter. Peyer's patches were apparently all ulcerated, the ulcers being mostly oval, and averaging .75 millimeters in diameter, and were deep, having the peritoneum as a base. Liver, normal; spleen slightly enlarged; lungs showed evidence of hypostatic congestion, especially on right side; no evidence of hepatization. Left side of heart contained large ante mortem clot; heart muscles flabby; valves normal.

CASE 14.

T. T.; aged twenty years; nativity, England; admitted to the marine ward, Mercy Hospital, Pittsburgh, Pa., November 17, 1888.

History.—This patient applied at the Marine Hospital dispensary on October 22 and 26, complaining of symptoms, which, though not distinctive, pointed to typhoid fever. On both these occasions he was advised to go to hospital, but refused, and disappeared from observation till November 17. On admission there was slight fever, 38° C.; diarrhea, tenderness over abdomen, and tympanitis. There were a few rose spots on the abdomen; tongue red and dry; pulse rapid and wiry. The symptoms of peritonitis increased in severity. The patient, already greatly emaciated, failed rapidly, and died on the 20th November.

Necropsy (four hours after death).—*Rigor mortis* present. The abdominal cavity contained considerable fluid and lymph, and the intestines were covered with lymph. Peyer's patches were found ulcerated throughout the length of the ileum, especially in the lower portions, where a perforation of large size was found. The cæcum was also intensely inflamed, and the intestines were much matted together by inflammatory exudation.

DYSENTERY.

CASE 1.

C. McC.; aged fifty-two years; nativity, Ohio; admitted to the U. S. Marine Hospital, St. Louis, Mo., January 19, 1889; died February 8, 1889.

History.—When admitted to the hospital patient was much enfeebled from diarrhea of several days' duration, and complained of severe pain in the lower part of the abdomen and in the rectum, especially while at stool; temperature did not ex-

ceed 39.2° C.: anorexia; raw tongue; weak, rapid pulse; frequent small bloody stools containing shreds of mucus; a persistent hiccough began about forty-eight hours before death.

Necropsy.—Body very much emaciated. *Rigor mortis* present; oblique inguina hernia on left side, the sac being empty; lungs and plenæ, heart and stomach all apparently normal; liver, spleen, and kidneys congested and softened; small intestines showed signs of recent inflammation in the ileum, in the wall opposite mesenteric attachment; large intestines were ulcerated, thickened, and roughened almost throughout from the ileo-cæcal valve to the anus; membrane denuded in many places, and hard, knotty projections at other points. The intestinal walls were very soft and easily broken through; peritoneal adhesions all along the large intestines.

CASE 2.

C. R.; colored; aged twenty-four; a native of Tennessee; was admitted to the U. S. Marine Hospital, Memphis, Tenn., May 24, 1889; died May 31, 1889.

History.—Frequent and bloody stools; much pain and tenderness along the colon; tenesmus; loss of flesh, strength, and appetite; hiccough distressing. Stools diminished in frequency by treatment until he had about five a day. He failed gradually, and died quite suddenly of paralysis of heart.

Necropsy.—Showed complete disorganization of the mucous membrane of the colon, and great enlargement of the mesenteric glands, many of which had undergone cheesy degeneration. All other viscera normal.

CASE 3.

Hepatic abscess.

J. G.; colored; aged twenty-seven; a native of North Carolina; was admitted to the U. S. Marine Hospital, Memphis, Tenn., April 16, 1889; died May 5, 1889.

History.—He was treated in the hospital for dysentery during June, July, and a part of August, 1888. It was with difficulty that his life was saved. Stools frequent, and contain much blood; there was tenderness to pressure over the colon throughout its course. Frequency of stools diminished by opium, and pain by turpentine stupes. The last ten days of his life he was troubled with distressing hiccough. The third day before his death his conjunctivæ became yellow.

Necropsy.—Lungs and heart normal. Kidneys congested. The mucous membrane of the colon was covered with ulcers of various shapes and sizes; some were as large as a dime, with abrupt edges and a yellow, necrotic base; some were 2 centimeters wide, extending entirely around the colon. All presented the same condition, varying only in size. At one place two pieces of the colon were adherent. When the two parts were carefully separated, and water poured into the colon, it flowed out into the abdominal cavity. Liver: In the right lobe there was a large abscess whose cavity would hold 1 liter. The right lobe was not much enlarged. The left seemed to have been enlarged in a compensatory way. The left lobe was made up of normal hepatic tissue. Spleen normal. During life there were no signs of hepatic abscess.

Weight of organs.—Liver, 2,645 grams; left lobe alone, 985 grams; right lung, 525; left, 510; heart, 300; spleen, 230; right kidney, 220; left, 260; pancreas, 90.

CASE 4.

J. K.; aged fifty-five years; nativity, Ireland. Admitted to the U. S. Marine Hospital, St. Louis, Mo., November 24, 1888; died November 29, 1888.

History.—When admitted he was emaciated and enfeebled, and complained of having had diarrhea for several days. Weak, rapid pulse, moderate fever; severe burning pain in the rectum; frequent, very offensive stools containing blood and a tough mucoid material; tenderness over the descending colon, depressed abdomen, body covered with cold sweat, the symptoms resisting treatment from the first.

*Necropsy (fifteen hours after death).—*Body emaciated. *Rigor mortis* present. Lungs were small and shrunken, the right one being almost unrecognizable, the left being more resistant than normal, and contained an excess of fibroid material. Heart normal and dilated. Stomach normal. Liver and spleen enlarged and very friable. Kidneys contained deposits of fat in central parts. Small intestines normal. Large intestines: Colon thickened, softened, and reddened, especially so in the lower portion where the membrane was roughened, and had a raw, ragged appearance, and was denuded in places, leaving the intestinal wall bare; in other places it was easily scraped off with a knife. A slate-colored pigmentation was noticeable on the surface of portions of the mucous membrane. Peritoneum, along the large intestine, was covered with fibrinous deposits.

INTERMITTENT FEVER.

CASE 1.

J. L.; aged forty-two; nativity, Norway; admitted to marine ward of St. Mary's Infirmary, Galveston, Tex., October 22, 1888; died October 24, 1888.

History.—When admitted he was unconscious; 15 grains of antifebrin was administered; he was seized with another congestive chill and died.

*Necropsy (seventeen hours after death).—*Body well nourished, but the skin of entire body presented a deeply jaundiced appearance; general appearance that of malarial cachexia. Lungs, slight hypostatic congestion. Heart, a firm, though small anti-mortem clot in left ventricle, intimately adherent to mitral valve. Some small spots of ecchymoser on endocardium of left ventricle; valves competent; organ in diastole; structure flabby. Liver, very much congested; gall-bladder filled with bile. Spleen, about three times the normal size; tissue very friable. Kidneys and bladder normal.

CASE 2.

E. H.; aged forty-four; white; a native of Ohio; was admitted to the U. S. Marine Hospital, Memphis, Tenn., August 19, 1888. He died before he could be put in bed. No one came with him, hence no history could be obtained. There was no sign of injury. It was supposed, as he had been sick only one day, that he had a congestive chill.

Necropsy.—No trace of any injury; body in good condition; all internal organs healthy, except the small intestine which was intensely congested, showing a pink hue from pylorus to ileo-cæcal valve. Liver, 1,700 grams; spleen, 100; 150 cubic centimeters of fluid in abdominal cavity.

CASE 3.

Inflammation of the cerebral membranes.

S. J.; colored; aged twenty-five; a native of Alabama; was admitted to the U. S. Marine Hospital, Memphis, Tenn., November 3, 1888.

History.—Chill every second day for a week; poor appetite and great weakness; pain in head; tongue coated and face has a stolid expression. He was given quin. sulph. .30 gram every four hours. The chills were stopped, but the temperature remained at 38, with the pain in the head about the same. When admitted there was occasionally some delirium, which became constant for the last two days that he lived. His hands were in constant motion. On the 6th his breathing became stertorous and rapid; took nourishment and medicine up to time of death, at 8.30 p. m. on the 6th.

Necropsy.—Emaciation. No scars on body. Thoracic and abdominal viscera normal. There was a very slight adhesion at the apex of right lung. In the head was adhesion of dura to pia mater, and of pia to brain. Convolutions slightly flattened. Brain substance normal. Surface of dura dull, not glossy. Weight of brain, 1417.5 grams.

CASE 4.

H. C.; aged twenty-one; nativity, Virginia; admitted to marine ward of St. Vincent's Hospital, Norfolk, Va., February 10, 1889; died February 16, 1889.

History.—This man was in a very bad condition when admitted; was very stupid and drowsy, and could with difficulty be made to understand what was said to him. His replies to questions were rambling and incoherent; he never recovered from this condition, but sank into a comatose state, in which he died.

Necropsy (twenty-four hours after death).—*Rigor mortis* well marked; body fairly well nourished. Lungs, slight old pleuritic adhesions at lower part of both lungs. Hypostatic congestion in lower part of both lungs. Heart normal. Stomach contained about 100 cubic centimeters of a dirty brownish fluid. Mucous membrane somewhat softened and darkened. Liver enlarged and congested. Spleen much enlarged, and very soft and puffy, and black. Intestines were somewhat congested, and contained bile and mucus. No ulceration found. Other organs were normal.

REMITTENT FEVER.

CASE 1.

K. H.; seaman; aged twenty-seven; nativity, Russia; was admitted to marine ward of St. Vincent's Hospital, Norfolk, Va., November 5, 1888; died November 16, 1888.

History.—He had been sick for some time, had a temperature of 39° C., and was very weak. The type of fever became remittent a few days after admission, and the stomach so weak and irritable as to necessitate the giving of nourishment by rectum. Antipyrine in 0.66 Gm. doses failed to reduce temperature to any extent, as also did sulphonal, and he died of exhaustion on the tenth day.

Necropsy (fourteen hours after death).—Body emaciated; *rigor mortis* well marked; old pleuritic adhesions bound right lung to the chest walls. Hypostatic congestion of both lungs posteriorly; heart normal. Intestines were somewhat congested, and mucous membrane softened. No ulcers were found. The stomach was empty, save for a few cubic centimeters of a dirty, brownish-yellow fluid. The mucous membrane was thickened and softened; spleen was enlarged and softer than usual, being quite pulpy and dark. Liver was enlarged, but otherwise normal. Other viscera were not examined. This patient was very sick on admission, and after a few days uncontrollable vomiting came on, producing exhaustion, of which he died.

CASE 2.

E. P.; aged forty-four; a native of England; was admitted to the U. S. Marine Hospital, Mobile, Ala., October 16, and died October 18, 1888.

History.—Was exposed to malarial influences for several weeks, whilst his ship was awaiting cargo. During this period he, with others, made free use of alcoholic stimulants to "ward off the fever." This stimulation amounted to a chronic state of inebriety, the officer stating that he had been continuously incapacitated from duty. On October 12 he had the first attack of fever, with a chill. From his statement, this must have continued, with slight remissions, until the morning of the 16th, when he experienced a severe chill, lasting half an hour. In the afternoon he reached the hospital and presented a most pitiable picture of intense malarial toxæmia and alcoholic tremor. Eyes and skin of saffron hue; tongue broad, pale, and indented; breath redolent of whisky; temperature, 38°; pulse, 100, weak and irregular; nervous exhaustion profound. During the night of the 16th, and on the 17th, he responded nicely to remedies exhibited to combat this exhaustion. Quinine and antifebrin given to control fever. There was a slight chill at 1 a. m. of the 17th. At 6 p. m., temperature, 38.8°; pulse, 100; skin hot and dry; pulmonary stasis of lower right lobe; threatening renal stasis; urine, 150 cubic centimeters in twelve hours. This was partially

relieved during the night. At 8 a. m. of the 18th there was another chill, severely congestive. Even the anal temperature was below 37° C. From this time to 8 p. m. every effort was made to restore the equilibrium of the circulation. He died in collapse.

Necropsy.—Skin of body a lemon yellow. *Rigor* marked. Hypostasis of chest and loins; prolabia purple; pupils dilated. Thorax opened; lungs congested; pleuræ normal, but deeply stained a saffron-colored hue; pericardium the same, its fluid increased and bile-tinged. Heart normal in appearance; incised; there were evidences of fatty changes. Abdomen: Liver enlarged, very friable, and of a pale snuff-color, a shade darker than "box-wood;" gall bladder distended; mesentery and intestines deeply bile-tinged; spleen about triple its usual size and could not be removed, except by handfuls of black-grumious blood and débris; kidneys engorged. The appearance of the abdominal contents, en masse, was that of a well-marked bronze. No pigmentation noted. Bladder held about 50 cubic centimeters of bile-urine. All fluids contained bile with nitric acid test. Brain not examined. The abdominal-wall fat was gritty, both to finger and scalpel. Some changes were due to alcohol, but death was caused by malarial toxæmia.

SECONDARY SYPHILIS.

CASE 1.

G. H.; aged fifty-three; nativity, New York; admitted to the U. S. Marine Hospital, Chicago, Ill., November 13, 1888; died February 28, 1889.

History.—Patient was transferred from the U. S. Marine Hospital at Detroit, Mich., having been treated there for secondary syphilis, in one form or another, for several years. His chief symptom, on admission, was a localized headache, referred to the frontal region of the left side. This headache was almost constant, varying, however, from a slight uneasiness to an almost intolerable pain, which prevented sleep. After being under treatment for about two months, signs of dementia appeared. Patient became a constant care. As his disease advanced, his appetite failed, and it was necessary to force him to take food. He rallied, however, regained his appetite and, to a great extent, his senses. He left his bed, and for a time progressed well. Suddenly, however, the headache returned, with all the bad signs that had previously accompanied it, and the patient sank rapidly. The inunction of mercury was diligently employed for a long period, keeping the patient just on the border of salivation. Bichloride of mercury and iodide of potassium were given by the mouth. For the headache, morphia, Dover's powders, chloral, bromide of potash, antipyrine, camphor and chloral, blisters to the nape of the neck, etc., were tried, being generally followed by little success. There was no paralysis at any time.

Necropsy.—*Rigor mortis* well marked. On removing the calvarium, the meningeal vessels were found engorged, the cerebellar portion being firmly adherent to the skull. There were ragged depressions in the bone, occupied by portions of the syphilitic growth. The entire left lobe of the cerebellum was absent, its place being occupied by an irregular gummatous mass, which had involved the falx cerebelli, and tentorium cerebelli. The lateral ventricles contained about 2 cubic centimeters of serum. The right lobe of the cerebellum and the entire cerebrum had undergone white softening. The other organs were not examined.

CASE 2.

Spasmodic asthma.

W. W.; aged thirty; nativity, New York; admitted to U. S. Marine Hospital, Chicago, Ill., November 13, 1888; died December 21, 1888.

History.—Patient was transferred from U. S. Marine Hospital, Detroit, Mich., suffering from secondary syphilis, ulcer of right leg, with necrosed tibia, spasmodic asthma, and was a victim of the opium habit. Some necrosed bone was removed

from the ulcer November 21, 1888. The dyspnœa and cephalalgia were relieved by antispasmodics and occasional doses of morphina. The asthma increased and appetite diminished.

Necropsy (eight hours after death).—Rigor mortis moderate: great emaciation; brain not examined; heart slightly hypertrophied; two perforations in one of the aortic valves, one of which was about 1.5 millimeters in diameter, the other half as large; lungs greatly expanded with air, escaping with a hissing sound on puncture; tissue tough; liver enlarged, but substance normal; spleen large, dark, and soft. One spot on surface showed pre-existing peri-splenitis, possibly syphilitic; kidneys large and congested; intestines and stomach normal; bladder contained about 50 cubic centimeters of urine.

CASE 3.

Necrosis of vomer, ethmoid, lachrymal, and orbital plate of superior maxillary bones.

H. B.; aged thirty-three; colored; a native of Virginia; was admitted to the U. S. Marine Hospital, Memphis, Tenn., December 22, 1888; died January 10, 1889.

He had been previously treated for secondary syphilis in the hospital, having been admitted October 27, 1887, and discharged March 27, 1888. He improved much under mixed treatment.

History.—Pain in nose and throat, poor appetite and great loss of strength, unable to swallow solid food, the swallowing of liquids giving great pain. He was unwilling to take any nourishment. Enemata were tried, but he derived very little aid from these, as a diarrhœa began in a few days after admission. He died of exhaustion on the 10th of January, 1889.

Necropsy.—*Rigor mortis* well marked and emaciation great. The mesenteric lymph glands much enlarged and cheesy; lungs in good condition, except peribronchial glands were enlarged. In the nose the nasal bones, vomer, ethmoid, lachrymal, orbital plate of superior maxillary, and ethmoid were all necrosed. The mucous membrane of the nose and pharynx were black and sloughing, and much thickened in places. Weight of liver 1,790 grams; brain, 1,279.

CASE 4.

Basilar meningitis with endarterites, thrombus and softening.

D. S.; white; age, thirty-nine; nativity, German; was admitted to marine ward of St. Mary's Infirmary, Galveston, Tex., on September 14, 1888, with a diffused eruption of secondary syphilis, and was discharged September 29, 1888, much improved. In October he was treated in the office for iritis. About December 1 he began to complain of severe agonizing pains in the head; worse at night, and in about two weeks he became deaf in the left ear, and partly so in the right. Double vision and dimness of sight came on, with a staggering and uncertain gait. Ophthalmoscopic examination disclosed double choked disks. A diagnosis of basilar meningitis was now made. The sense of taste on the back of tongue was lost. On or about the latter part of February he passed from under treatment for about ten days; took scarcely any medicine. On March 6 he was seized with right hemiplegia, having had premonitory symptoms for several days. Thrombus of left middle cerebral artery was diagnosed. Softening of the area supplied by this vessel soon began and the patient died on April 20, 1889.

Necropsy (fourteen hours after death).—Only the brain was examined. Great difficulty was experienced in separating the dura mater from the base of the skull. In several places pieces of it were torn off and left clinging to the bones, so intimately adherent was it. In the part covering the base of the brain the dura was very much thickened. Upon stripping off this membrane from the brain all the basilar portion of the pia mater was found to be much thickened, forming a tough, fibrous membrane. The choroid plexuses were thickened and hyperæmic. This fibrous thickening surrounded most of the cranial nerves arising anterior to the pons varolii. Portion of the brain substance

adhered to the pia when it was stripped off. In the left middle cerebral artery a thrombus was found, almost completely obstructing the lumen of that vessel. Upon removing the thrombus the endothelium was found to be much thickened and rougher than normal. This thrombus was hard and of a fibrous consistence, formed just after the artery is given off from the internal carotid. All the basal portion supplied by this vessel was very pale and anæmic. Just behind the sylvian fissure, on the basal aspect of the middle lobe, in fact in the parietal lobe, there was a spot of softened brain tissue 3 centimeters long by 2 centimeters in width, extending into the brain about 2.5 centimeters.

SEPTICÆMIA, CARDIAC THROMBOSIS.

J. G.; aged twenty; negro; native of Kentucky; entered the marine ward of the Evansville City Hospital February 20, 1889; died March 18, 1889.

History.—On admission the patient was suffering from ulcers of penis and of internal aspect of thighs. Suppuration of right inguinal glands supervened; the buboes were incised, pus evacuated, and poultices applied. Patient appeared to be in good condition until March 12, 1889, when the discharge from buboes ceased. He was seized with a severe chill; temperature rose to 40° C., respiration to 40, pulse to 106. His temperature continued almost stationary, above 40° C., until death occurred on the morning of the 18th. There was marked meteorism, pain was complained of over right hepatic region, and slight diarrhea was present. Mental condition was dull, semi-delirious; tongue dry and coated, and complete anorexia. Cough, with purulent expectoration, and scanty, high-colored urine complete the symptomatology.

Necropsy (six hours after death).—No *rigor mortis*. Lungs: Right lung small, but normal in other respects; left lung, with the exception of a small portion of its upper lobe, was in a condition of red hepatization, with a few scattered points of suppuration appearing in the lower lobe. Heart was smaller than normal and contained ante-mortem fibrinous coagula in both right and left chambers; no valvular defects. Pancreas normal. Spleen small, but congested and friable. Liver was hypertrophied, but presented no other special pathological change. Gall-bladder empty. Kidneys were normal in size, firm and leathery on section, and contained a few drops of puriform fluid in their pelvises. Brain and intestinal tract not examined. Vermiform appendix filled with a tenacious mucus. Lymphatics not examined. No coagulated blood was present in heart or vessels.

SCURVY—COMPLICATION—BRIGHT'S DISEASE.

W. H. B.; aged thirty-six; born in Ireland; was admitted to the U. S. Marine Hospital, port of New York, on March 14, 1889, and died March 20, 1889.

History.—On being admitted he gave the following history: Has been sick nineteen days with pain and swelling of the knee-joints; then the scrotum began to swell; his ankles also swelled and were painful. His feet and ankles are swollen now, but destitute of feeling rather than painful; his scrotum also swollen; pain is chiefly in the the thighs. The sides of his neck are swollen, but not at all painful. His voyage was from Calcutta, and he was taken sick four months out. Pulse 110; respiration 28; temperature 37.8 ° C.; complains of shortness of breath; appetite is poor, bowels regular, tongue flabby and cracked. He says his mouth is sore and sometimes bleeds; gums are spongy and breath fetid. [States that six men on the ship were taken sick in the same manner, and that one died.

March 15.—Did not sleep last night; pain in his legs and across his abdomen; gums sore; tongue dry and cracked.

March 16.—Better to-day; slept well; cough rather troublesome.

March 17.—Is vomiting and complains of pain in his legs and feet; vomited matter green and watery.

March 18.—Considerable swelling about his neck; abdomen tympanitic; bowels moving freely.

March 19.—Is much worse this morning; abdomen is very much distressed, and gives evidence of effusion, having lost its tympanitic character since yesterday; temperature 37.8° C; pulse 110; respiration 40. Lies on left side with knees and legs flexed; moist rales over lower part of left lung, puerile respiration over right; countenance anxious; tongue dry, hard, and glazed. Antiscorbutic and tonic remedies were administered, but despite all these he gradually became weaker and died on the 20th.

Necropsy (eleven hours' post mortem).—Body of a well-nourished white man; *rigor mortis* was well marked. On opening the thoracic cavity the right and left pleural cavities were found filled with fluid. The left lung weighed 660 grams, and was small, compressed, and œdematous; the right lung was œdematous, congested in circumscribed localities, gray in general appearance, and filled with a white frothy exudate. This lung weighed 1,034 grams. The pericardium was filled with fluid. The heart was of normal size and weighed 780 grams; the heart tissue was normal, with large deposits of fat upon it externally. There was slight eccentric hypertrophy of the left ventricle; the valves were all competent. The liver was very fatty and weighed 2,230 grams. The spleen was normal in size, lobulated, and slate-gray in color externally; on section the tissue was very red and hyperæmic. The left kidney was small and lobulated, and weighed 180 grams; on section the organ showed chronic parenchymatous degeneration. The right kidney weighed 200 grams and presented the same pathological appearances as the left.

ALCOHOLISM.

CASE 1.

W. W.; aged fifty-nine; nativity, Scotland; admitted to the U. S. Marine Hospital, New Orleans, La., July 24, 1888; died July 30, 1888.

History.—When admitted he was too feeble to give any history of himself except that he had been drinking and that for the last few weeks his stomach had refused to retain anything. There was no evidence of any special disease. Every effort was made to nourish him, but he continued to vomit everything given him by his mouth, and gradually grew weaker. Thirty-six hours before death he became pulseless, and refused to take anything.

Necropsy.—Body was extremely emaciated, but he had evidently been a strong, well built man. Lungs: No adhesions, at bases slight hypostatic congestion; otherwise the lungs were normal. Heart: No fluid in pericardial sac; the organ was small, its tissues very pale, valves healthy; upon cutting the venæ cavæ the small quantity of blood was noticeable. Stomach: Mucous membrane very pale; no evidence of cancer or any inflammatory action. Pancreas: Gave no sign of disease. Liver was about the usual size, and seemed to have more blood in it than all the rest of the body; it was congested, soft, etc. Gall-bladder was empty. Intestines healthy, but anemic. Kidneys: Capsules were adherent, the tissues pale, normal in size, but granular. On cortex of both kidneys there were several vesicles about 3 cubic centimeters in depth and diameter, containing serum. Brain not examined.

CASE 2.

C. D.; seaman; aged twenty-five; nativity not known; was admitted to marine ward of St. Vincent's Hospital, Norfolk, Va., October 9, 1888; died October 10, 1888.

History.—Patient had been ashore from his vessel and returned very drunk on October 7. Two doses of quinia were given him by his captain. He became unconscious on the 8th, and was taken to hospital in that condition by the ambulance on the 9th. He remained unconscious, with pupils slightly contracted, skin moist and cold, pulse weak and irregular, breathing superficial, until his death at 8 p. m. on the 10th.

Necropsy (fourteen hours after death).—Body well nourished. *Rigor mortis* well marked. Brain congested. Dura mater adherent along line of longitudinal fissure. Pia mater somewhat thicker than usual, non-adherent, and stripped readily, small amount of fluid in sub-arachnoidean spaces. Brain tissue normal in appearance. Convolutions and fissures well marked. Lungs partially collapsed and normal in appearance anteriorly, posteriorly intense congestion. Right lung, lower lobe was in a state of hepatization, due to tuberculous inflammation. In the left lung evidences of the same inflammatory action were found. The lower part of the upper lobe was also involved on the sides. Heart was normal in size and appearance, so was not examined. Right kidney was removed and found normal; left not examined. Liver weighed 3 kilos; otherwise normal. Spleen enlarged; otherwise normal. Other viscera not examined. The case was received in a comatose state, and did not recover consciousness.

CASE 3.

F. A.; aged forty-two years; nativity, Missouri; admitted to the U. S. Marine Hospital, Louisville, Ky., April 4, 1889; died April 8, 1889.

History.—The patient when admitted was suffering from delirium tremens, had hallucinations, and slept but little. In the course of two days he developed pneumonia. His condition became steadily worse. The last night of his life he had to be restrained in bed. He died in the morning from exhaustion and obstruction of respiration.

Necropsy (six hours after death).—Body of a well nourished man. *Rigor mortis* well marked. On opening thoracic cavity recent fibrinous deposit was found upon the surfaces of left pleura. The upper lobe of left lung was in a condition of gray hepatization passing into purulent infiltration. A large cavity surrounded by broken down lung tissue was found in the lower portion of this lobe. The lower lobe of this lung was congested and œdematous. Old and firm adhesions were present in the right pleural cavity. The right lung was œdematous. The liver was enlarged and fatty. The kidneys and remaining viscera were normal in appearance.

RHEUMATISM.

CASE 1.

Inflammation of the cerebral membranes.

C. J.; colored; aged twenty-seven; nativity, America; admitted to U. S. Marine Hospital, Cincinnati, Ohio, April 30, 1889; died May 15, 1889.

History.—Upon admission and for ten days subsequently patient complained only of severe pain in the lumbar region of back. Otherwise he felt well. Temperature and pulse were normal throughout, except on the evening of the 14th, when the former was 38½, and the latter 84. His mind was apathetic from day of admission, though there was no marked delirium until three or four days before death, when a watch had to be placed over him to prevent his getting out of bed. Twelve hours before death he became totally unconscious; he laid prone on his back with his head elevated by two pillows, staring fixedly at the opposite wall, all attempts to arouse him to the slightest intelligence being fruitless. The pupils were contracted. He died in the evening of May 15, without regaining his reason.

Necropsy (fourteen hours after death).—*Rigor mortis* well marked; body well nourished; brain only examined. Upon removing calvarium the surface of the brain, the pia mater, and dura mater are seen to be intensely congested; upon section a like condition is found in all parts of the cerebrum and cerebellum. The choroid plexus on each side is greatly inflamed, and partially broken down. All the ventricles are distended, with a serous effusion.

CASE 2.

Inflammation of the cerebral membranes.

W. W.; colored; aged twenty-four; a native of Tennessee; was admitted to the Marine Hospital, Memphis, Tenn., March 8, 1889; died March 15, 1889.

History.—Has been sick ten days. At first had a chill every day for three consecutive days. With quinine improved and made a trip. Now complains of pain in wrist, elbow, and shoulder, which is so severe that he can not move his arm. Complains of some pain in his head, but this is slight when compared with that in his arm. Pain in arm removed by anti-rheumatic treatment. Pain in head increased and became lancinating. No cough or pain in his chest. March 11, 1889, symptoms of compression of the brain appeared. He soon became comatose, and died on the 15th.

Necropsy.—Dura mater adherent to pia mater and arachnoid. Pia mater adherent to brain along the longitudinal sinus. There were vegetations in the longitudinal sinus. Some purulent fluid escaped from beneath the pia mater when it was incised. The convolutions were flattened. At the base of the brain there was a tough false membrane, intimately connected with the vessels at the base. This false membrane extended from the fornix anteriorly backward around the medulla and upward upon the vermiform process of the cerebellum. Laterally the membrane extended 2 centimeters beyond the pons varolii.

ANGEIOMA OF NATES—FATTY HEART.

J. K.; aged thirty-four years; nativity, Germany; admitted to U. S. Marine Hospital, Cairo, Ill., December 6, 1887; died September 28, 1888.

History.—On admission this patient had a large angeioma mixed variety on right buttock. Shortly after his transfer to the charge of this reporter the tumor was thoroughly injected with fluid extract of ergot, with the hope of exciting sufficient inflammatory action to cause its sloughing. A large portion of the tumor was thrown off, the remaining portion sloughing considerably. There was but little hemorrhage. The patient increased remarkably in weight and strength for some time. The tumor recommenced growing, the center being occupied by a spongy fungoid mass, bleeding at a slight touch. Complete extirpation was decided upon. The patient was placed under ether, and the entire growth removed with the knife. Hemorrhage, which was considerable, was checked by the galvano-cantery. At the conclusion of the operation the patient suddenly ceased breathing, and despite every effort died.

Necropsy (twenty-two hours after death).—Body that of a unsenar man, somewhat emaciated. *Rigor mortis* feebly marked. Heart, omentum, and all the abdominal viscera loaded with fat. Right pleura showing signs of old inflammatory action. Right heart, advanced fatty degeneration. Valves, right auriculo-ventricular incompetent. Right lung, inferior surface adherent to diaphragm, both lungs congested, the left showing tuberculous masses. Liver, weight, 2,300 grams, pale, friable on section showing pus. Gall-bladder walls œdematous. Kidneys, laden with fat. Spleen, swollen, flabby, on sections showing pus. Pancreas, nodular, hardened.

TUMOR OF THE CEREBELLUM.

J. D.; aged fifty-five; nativity, England; admitted to U. S. Marine Hospital, New York, November 12, 1888; died December 25, 1888.

Necropsy (seventeen hours after death).—*Rigor mortis* slight. Lines on post surface of body. Skull opened. Dura mater non-adherent. Just above the frontal sinus there were several deep sulci on inner surface of skull, into which the membranes and brain fitted. Falx cerebri-cribriform, all vessels on surface engorged. Left lateral ventricle distended with serum. Several small cystic bodies in choroid plexus. All tissue of cerebrum normal, except small puncta hemorrhagica. In right hemisphere of the

cerebellum there was found a large tumor, easily enucleated; brain tissue surrounding not notably softened. Section of tumor showed it of firm consistency and white in color. Both lungs hypostatic; congestion of lower lobes. Other organs normal.

CARCINOMA.

CASE 1.

Scirrhus of the stomach.

E. M.; aged forty-four years; native of Massachusetts; was admitted to the U. S. Marine Hospital at Chelsea, Mass., May 27, 1889; died June 17.

History.—Patient had been in hospital some weeks before with the diagnosis of intermittent fever, his history of having had chills and fever for several years past being misleading. Not improving, he requested to be discharged, but was readmitted a week later in a condition of extreme prostration. Patient was extremely thin, weak, complexion sallow, and had several chills at irregular intervals, with nausea and vomiting; evidently the subject of some malignant disease of the stomach or liver. The vomiting continued daily whenever anything was swallowed, the evacuated material having a coffee-ground appearance; obstinate constipation, and progressive weakness and emaciation, the patient being sustained some weeks solely by nutritive enemata. There was no pain at any time.

Necropsy (eighteen hours after death).—*Rigor mortis* well established, and body emaciated to the last degree. Heart was very small, weighed 205 grams. Lungs normal in appearance, except congestion posteriorly and marked pigmentation at both apices; left lung weighed 655 grams, and contained several isolated deposits of tubercle, more numerous in the upper lobe, but they had undergone fibroid (?) transformation, and were inactive; right lung weighed 670 grams; no tubercular deposits. Liver weighed 1,480 grams; of golden yellow color; smooth surface; slight congestion of anterior part of right lobe; left lobe firmly adherent to the lesser curvature of the stomach, the walls of the latter being perforated in the effort to separate them. Three hard tumors situated in the stomach; two in the anterior wall along the lesser curvature, near each other, projecting into the stomach, shaped somewhat like mushrooms, and each about $2\frac{1}{2}$ centimeters in diameter; on the posterior wall, near the œsophageal opening, another indurated tumor existed, somewhat larger than the preceding, and projecting into the stomach; all the walls of the stomach were involved in the growth, but the mucous coat chiefly; neither opening in the stomach was encroached upon; mucous membrane of the stomach somewhat congested and inflamed; behind the œsophageal opening was situated a tumor about the size of a large orange, soft and fluctuating, and, on section, yielding pus and cheesy material—evidently a lymphatic gland which had undergone secondary infection; weight of stomach and tumors, 615 grams. Spleen weighed 125 grams; pale and adherent to the stomach. Kidneys, large and pale; weight of left, 160 grams; of right, 155 grams; the capsules were not adherent, but some points of congestion were visible externally; the tissue was tough on section, and internally patches of connective tissue were abundant; right supra-renal capsule was the seat of a tumor about size of a lemon, fluctuating, weighing 125 grams, and with contents similar to those of the secondary growth above mentioned.

CASE 2.

Scirrhus of stomach.

C. B.; aged forty-one years; born in Germany; admitted to the U. S. Marine Hospital, Chicago, Ill., May 9, 1883; died July 3, 1888.

History.—On admission to the hospital, he gave a very unsatisfactory and contradictory history. He first stated that he had only been sick two weeks, and had

never quit his work. Subsequently, he gave a different history, stating that he had been troubled off and on for the last two years from constipation and occasional spells of vomiting. He had also gradually lost flesh and appetite, and was now reduced to a mere skeleton. When he first applied for treatment, February 20, 1888, he was suffering from severe constipation, which was with great difficulty relieved by enemas and cathartics, after several days. He had a slight hacking cough, with dullness over the apex of both lungs. His abdomen was very much distended by gas and fecal matter. On palpation over the abdomen it was thought that small tubercular deposits could be detected. The patient was given much nourishing diet; but he gradually lost flesh.

June 1, the patient had improved some and wished to be discharged, as he wished to go to Waukesha Springs and try the water. He remained away from the hospital nine days, and then returned in a very bad condition. He could not retain anything on his stomach. The walls of the abdomen were now very thin, and an enlargement of the pyloric end of the stomach could be easily detected. His symptoms now all pointed to cancer of the stomach, which diagnosis was made. He grew worse rapidly, and died of inanition, as it was impossible for him to retain any food on his stomach, and rectal alimentation did not seem to benefit him.

Necropsy (five hours after death).—*Rigor mortis* well marked. Body greatly emaciated. Lungs: A few miliary tubercles were found in the apex of left lung. Old pleuritic adhesions bound left lung to chest wall. Right lung normal. Heart ceased beating in systole. Stomach: Greatly dilated, and contained 2,500 cubic centimeters liquid ingesta. Mucous membrane softened. Large non-perforating ulcer at cardiac portion of greater curvature. A large scirrhus tumor, 7 centimeters in diameter and 12 centimeters in length, was found embracing the pylorus and the head of the duodenum. It extended to the head of the pancreas, involving a large portion of its tissue. Large nodular masses, originating at the head of the pancreas, embraced the descending portion of the duodenum. Tumor here was fully 13 centimeters in diameter and irregularly ovoid in shape, and contained several foci of suppuration. Tumor had contracted the caliber of the duodenum to less than 1 centimeter in diameter in its descending portion. Right and left lobes of the liver were infiltrated with several cancerous deposits from 2 to 5 centimeters in diameter. Gall-bladder dilated, and contained 150 cubic centimeters bile. Kidneys slightly congested, but otherwise normal.

CASE 3.

Scirrhus of rectum.

C. D.; aged 34; nativity, Louisiana; admitted to the U. S. Marine Hospital, Chicago, Ill., November 13, 1888; died March 3, 1889.

History.—Patient was transferred from the U. S. Marine Hospital at Detroit, Mich., where he was treated for ulcer and stricture of the rectum. Said he was operated on there nineteen times, and cauterized with nitrate of silver.

December 14, 1888.—Stricture was dilated with a bougie and cut, as there was great resistance, and the lumen was small.

December 20.—Chloroform given, and the stricture dilated with a No. 9 rectal bougie.

January 5, 1889.—Operation repeated.

February 25, 1889.—The operation was again repeated, the passage of the bougie being attended with great resistance. One hour later the patient complained of severe pain, with cramping in the intestines. Morphia had to be administered twice in half an hour. The temperature at 6 p. m. was 39.2° C. Hot applications were made to the abdomen. The pain continued, but his temperature fell in a few days below the normal. He died March 3.

Necropsy (eighteen hours after death).—*Rigor mortis* moderate. Limbs, neck, back, and arms discolored by *post-mortem* ecchymosis. The heart contained a *post-mortem* blood-

clot. Lungs were normal. Abdomen distended with flatus. Epiploon adherent to the intestines wherever it touched. The abdominal cavity contained 1,000 cubic centimeters of a yellow flocculent and purulent exudation. The small intestines were distended with gas. The mesenteric glands were much enlarged. The liver was normal, with slight congestion. Stomach was normal, but adherent. The ascending, transverse, and part of the descending colon were normal and empty. The rectum, sigmoid flexure, and a portion of the descending colon, in all 47 centimeters, were involved by a malignant growth, causing numerous strictures of the lumen. This mass was hard, nodulated, with some fatty deposit. Three ulcers existed at the sigmoid flexure, with perforation, through which fecal matter had escaped. The left kidney was normal; the right was smaller. The right supra-renal capsule was of a black color. The spleen was large and soft.

CASE 4.

Epithelioma of the larynx.

T. D.; aged 50 years; nativity, Ireland; admitted to the marine ward, Mercy Hospital, Pittsburgh, Pa., December 24, 1888; died March 4, 1889.

History.—On admission the patient complained of pain and difficulty in swallowing and slight gastric disturbance. The voice gradually passed from huskiness to complete aphonia. There was progressive emaciation and dyspnœa; the latter became so distressing as to necessitate tracheotomy, which was done on March 1. As a result, respiration became freer, and the cyanosis which had been present disappeared. Death was due to exhaustion.

Necropsy (eight hours after death).—*Rigor mortis* marked; body greatly emaciated. The œsophagus was normal. The larynx presented the characteristics of epithelial cancer; the vocal cords were completely destroyed, and numerous nodules pressed upon the œsophagus. The heart was normal; the pleuræ everywhere adherent, and lungs slightly congested. Liver and kidneys cirrhotic. Spleen enlarged. Stomach and intestines normal. No family history was obtainable, but the patient had been a hard drinker.

CASE 5.

F. M. K.; aged forty-one years; nativity, United States; admitted to U. S. Marine Hospital, San Francisco, Cal., February 5, 1889; died February 5, 1889.

Necropsy.—Surface pale; a moderate quantity of subcutaneous fat. The pericardial sac contained about 50 cubic centimeters of serous fluid. The heart was much enlarged and the walls extremely fatty. There were numerous pearl-colored bodies, apparently miliary tubercles, following many of the blood vessels on the surface of the organ. The liver was pale in color, and cut with some difficulty, owing to an increase of fibrous tissue. There were several slight attachments between the upper surface and the diaphragm. The under surface was covered with greenish lymph and was fastened over a portion of its extent to the upper border of the stomach. The stomach was adherent to the surrounding parts so intimately that it was not removed. The part which had become attached to the liver was so softened that it was ruptured in separating. It contained a cancerous mass extending nearly its entire length, and about 4 centimeters in thickness at the center. The openings of the stomach were not affected by the growth which occupied almost the entire posterior mucous wall. The spleen was about one-quarter larger than normal, and very soft and friable.

CASE 6.

Encephaloid of kidney.

G. M., aged sixty-eight; nativity, England; admitted to the U. S. Marine Hospital, Cincinnati, Ohio, September 17, 1888; died January 5, 1889.

History.—Patient applied for relief on account of a profuse hæmaturia. He stated that he first noticed the trouble a year ago, but had paid very little attention to it until within the past two months, when, finding that it was becoming worse, he en-

tered a hospital in an adjacent city; obtaining no relief he came here. Upon admission here the urine voided was made up so largely of blood that a thick coagulum formed at the bottom of the vessel. There was slight tenderness upon pressure in the left lumbar region. No tumor could be detected. He complained of no pain whatever, except, as occasionally happened, when the urethra became plugged with coagulated blood, which prevented the passage of urine. At such times it was necessary to empty the bladder by means of the catheter. Alkalies and astringents internally, as well as applications of ice to the perineum, did not exercise the slightest influence. Under small doses of morphia, repeated every three hours, in conjunction with hot poultices over the hypogastrium, the urine cleared up within three days. After this there were recurrences of the hæmaturia every two or three weeks, which invariably subsided within twenty-four to forty-eight hours after the exhibition of morphia. The patient, instead of growing stronger, however, grew weaker daily; he became emaciated, and in November a small tumor was detected in the left lumbar region. This increased in size very slowly until towards the latter part of December, when it took on a rapid growth; its progress could then be noted day by day. A week before death the tumor could be felt extending from the left hypochondriac region above to the crest of the ilium below, and transversely across the abdomen to an inch to the right of the umbilicus. Death occurred from exhaustion on date above given.

Necropsy (seventeen hours after death).—Body emaciated to a skeleton; *rigor mortis* well marked. Heart atrophied; weight, 255 grams. Left auricle and ventricle filled with a fibrinous clot. Lungs bluish gray in color (anthracosis); firm adhesions over right lung to chest walls, and both lungs firmly adherent to diaphragm; otherwise normal. A tumor about the size and shape of an English walnut was found adherent to anterior surface of trachea in region of thymus gland. It was easily detached, and did not invade the cartilaginous structure of trachea. Upon section it was found to consist of a grayish pulpy substance. All the abdominal viscera were so matted together it was difficult to separate them. Liver very fatty; weight, 1,552 grams. Spleen weighs 192 grams. Right kidney apparently normal, though quite pale. Left kidney had degenerated into a great lobulated cancerous mass in which all resemblance to the kidney is lost, and every vestige of healthy kidney substance destroyed. It was firmly adherent to the small intestines and descending colon. Weight, 2,048 grams. Its interior is made up partly of cysts containing pus, and partly of a grayish pulpy substance the consistence of cottage cheese.

CASE 7.

Encephaloid of mediastinum and lung.

C. S.; aged thirty-one years; nativity, Norway; admitted to U. S. Marine Hospital, San Francisco, Cal., February 1, 1889; died March 20, 1889.

Necropsy (about twelve hours after death).—*Rigor* slight. Emaciation considerable. Œdema of left side, thoracic, hands, face, and neck. Tumor (incised) over upper sternum about the size of an orange. Left pleura almost entirely obliterated by cancerous adhesions. The whole left lung was a mass of medullary matter, except a small area at posterior portion of apex, which was also the only spot free from pleuritic adhesions. The lung was broken down so as to form a sort of cavity at outer side of lower lobe, containing bloody serous matter and débris. Right pleura contained about 1,500 cubic centimeters of bloody serum. The lung was nearly everywhere above the effusion bound down by adhesions to pleura. From the diaphragmatic pleura grew a number of nodular, more or less pedunculated, neoplasms of the same nature as that infiltrating the left lung. The right lung was congested but healthy, except for two small nodules near the apex, and a more considerable invasion at the inner border of upper lobe. The heart was forced considerably to the right, so as to reach beyond the right border of sternum, and appeared fatty. In the pericardium was some 50 cubic centimeters bloody serum. The superior vena cava, aorta,

and pulmonary artery, the roots of the lungs, œsophagus, and bifurcation of trachea, were enveloped in a mass of cancer, probably the primary growth, which filled both mediastinal regions, somewhat eroded the sternum, and perforated the first intercostal space on either side of that bone. This mass was as large as a cocoanut, and was probably continuous through the perforation with the medullary tumor already noted over the upper end of sternum. Upon dissecting away the external tumor the sternum was found eroded, and fractured easily in this situation. There was nothing remarkable in the abdomen. The liver was somewhat fibrous and congested, jaundiced a yellowish green, but neither in it nor any where else were found any metastatic deposits except those noted in right pleura.

CASE 8.

Epithelioma of tongue.

H. G. R.; aged forty-four years; nativity, Georgia; admitted to U. S. Marine Hospital, San Francisco, Cal., November 1, 1888; died February 7, 1889.

History.—Admitted for ulceration of fauces. About a month later there was found on the tongue near its center on the upper surface a hard growth about 3 lines in diameter. About the same time the lymphatic glands on the right side of the neck became swollen, and there was some difficulty in swallowing. The disease advanced slowly, ulceration occurring on the side of the tongue, and externally over the diseased lymph glands. The patient became cachectic in appearance and suffered considerable pain constantly.

Necropsy.—Externally there appeared a cauliflower ulcer about 10 centimeters in diameter, with a suppurating sinus in the center which communicated with the oral cavity. When the inferior maxilla was removed the posterior two-thirds of the tongue was found to have ulcerated away, the greater loss occurring on the right side. The pharynx contained some clotted blood, but the vessels from which recent hæmorrhages had occurred could not be located. Death was caused by gradual exhaustion and repeated small hæmorrhages.

TUBERCULAR MENINGITIS.

E. H.; aged twenty-nine years; nativity, South Carolina; was admitted to marine ward of the City Hospital, Charleston, S. C., on February 25, 1889, and died March 3, 1889.

History.—Unconscious when brought to hospital. Emaciation extreme; pupils widely dilated and non-responsive to light; low muttering, delirium, and restlessness. Only for a moment, at times, was he semi-conscious, and no preceding history could be obtained.

Necropsy.—Body emaciated; *rigor* present; lungs infiltrated with gray tubercle; left apex cavernous; pleura generally adherent; peri cardial fluid increased; tubercular peritonitis; calvarium removed: pia-mater of base tubercular; fluid in ventricles to distention; brain anæmic.

ACUTE MILIARY TUBERCULOSIS.

G. P.; aged twenty-two years; native of Sweden; was admitted to U. S. Marine Hospital at Boston, Mass., June 6, 1888; died July 26.

History.—On admission patient complained of weakness and shortness of breath. Had had several hemorrhages, but no cough, and had lost little in weight. The physical signs were so indefinite that he was at first thought to be suffering from disease of the heart with congestion of the lungs; but in a short time the regular evening rise of temperature and more definite physical signs pointed to acute milary tuberculosis. The disease progressed rapidly to a fatal termination. There was no cough and little expectoration in the course of the disease, but high temperature, 38° to 40° C., dyspnœa, and rapid emaciation.

Necropsy (one and one-half hours after death).—No rigor mortis; considerable emaciation. Heart weighed 370 grams, normal. Right lung weighed 1,075 grams; adherent throughout to chest wall; every portion of the lung impregnated with gray tubercle. Left lung weighed 650 grams; no pleuritic adhesions; upper lobe filled with small gray tubercles, and some in lower. No cavities in either lung.

TUBERCULOSIS WITH CHRONIC PERITONITIS.

J. H. (colored); aged forty-three; nativity, Virginia; admitted to marine ward, St. Vincent Hospital, Norfolk, Va., July 31, 1888; died October 20, 1888.

Necropsy (six hours after death).—Body emaciated; rigor mortis well marked. Extensive old pleuritic adhesions bound the lungs of both sides to the chest walls; color of lung gray. Extensive tubercular cheesy deposits were scattered through the lungs of each side. Numerous cavities, varying from the size of a hen's egg to a small marble, were found; they were especially numerous in the upper lobes. The abdominal cavity contained a large quantity of serous fluid. The intestines were matted together and covered with inflammatory lymph, the result of a chronic inflammation. The omentum and mesentery were studded with numerous tubercular deposits, all of small size. Other viscera not examined.

TUBERCLE OF LUNGS.

CASE 1.

H. S.; aged forty-nine years; a native of Germany; was admitted to the U. S. Marine Hospital, New York, on April 3, 1889; died April 17, 1889.

History—Had been in good health until eighteen months previously. First symptom was cough, which he attributed to getting wet. Has been losing flesh for the past year, with increasing expectoration, and for past few months has been having night sweats. Had hæmoptysis once. On admission was extremely emaciated; cough persistent at night. Physical examination showed area of consolidation at both apices; bronchial râles disseminated over the chest. Heart sounds weak; no appreciable enlargement of other organs.

Necropsy (twelve hours after death).—Body much emaciated, and rigor mortis well marked. The left lung was attached to the diaphragm and to the chest wall posteriorly by very firm old pleuritic adhesions. It weighed 415 grams. The apex was infiltrated with tubercular matter, and presented spots of both calcification and caseous degeneration. The lower lobe was congested. The right lung weighed 1,100 grams, and its lobes were bound to each other and to the chest wall by old pleuritic adhesions. There was an acute bronchitis present in the upper lobe and œdema in the middle and lower lobes. The heart weighed 365 grams, and contained fresh clots. The muscular structure was apparently normal, and the valves competent. The liver was bound to the diaphragm by firm old adhesions. It weighed 1,372 grams, and was slightly fatty. The spleen was small, weighing 103 grams; the exterior was of a slate-gray color, and the pulp normal. The kidneys were much congested, and the capsules slightly adherent. Microscopical examination showed them to be the seat of both parenchymatous and interstitial nephritis. This, with the weakness of the heart, would account for the sudden onset of pulmonary œdema, which was the immediate cause of death.

CASE 2.

J. M.; aged thirty-nine; born in Ireland; was admitted to the U. S. Marine Hospital, port of New York, on January 14, 1889, and died February 8, 1889.

Clinical history.—Has been pretty healthy up to fourteen months ago, when he contracted a cold and was treated for it in this hospital. Has been gradually going down since he was discharged; complains of cough with yellowish expectoration

and pain in his chest. Has shortness of breath and œdema of legs; also night sweats and diarrhœa. General appearance: Very much emaciated and sallow. Tongue red and raw.

February 2.—Had severe hemorrhage from his nose.

February 3.—Epistaxis continues at intervals.

February 6.—Epistaxis still continues. Patient became much exhausted and died on the 8th.

Necropsy (sixteen hours after death).—Body of a white adult male, much emaciated. *Rigor mortis* was well marked. On opening the thorax old pleuritic adhesions were found at the apex of the left lung. The tissue of this lung was dense from engorgement and the upper lobe completely solidified with tubercular infiltration. The lower lobe was hyperæmic, congested, and irregularly studded with gray and yellow tubercles. The plenra of the right lung was adherent to the chest walls, pericardium and diaphragm. The lung was completely filled with tubercles, and several small cavities existed in its upper lobe. The heart was rather large, flabby and anæmic, and full of clots. The right ventricle was dilated, the walls being not more than 2 centimeters in thickness. The left ventricle contained a large *ante-mortem* clot, decolorized and adherent to the endocardium. Its walls were rather thin, measuring 1 centimeter in thickness. The mitral valves were thickened but competent; the aortic valves were competent. The liver was fatty, weighing 1,690 grams.

The gall-bladder was moderately full. The left kidney was large, pale, and waxy, weighing 195 grams. Several small cysts appeared upon section, one of which projected externally. The right kidney was cirrhotic and cystic, and weighed 55 grams. Only a small remnant of true kidney structure remained at a single point.

CASE 3.

A. V.; aged thirty-six; a native of New York; was admitted to the U. S. Marine Hospital at New York on February 13, 1889, suffering with acute bronchitis. He was discharged recovered March 17, and readmitted for "ulcération of the larynx, tubercular." He rapidly lost his voice and failed steadily, his stomach having become intolerant of even the blandest ingesta, and died at 4.30 p. m., May 1, 1889.

Necropsy (forty-eight hours after death).—Body of an emaciated white male; three large scars on dorsum of penis. Right lung attached by general adhesions to diaphragm, pericardium, and thoracic walls. The entire lung was thickly infiltrated with tubercle. Left lung closely adherent throughout. There was a large cavity at the apex, and the entire lung was studded with tubercular foci. Heart contained some *post mortem* clots; the valves were normal. Spleen was normal. Right kidney normal in size; it contained a few tubercles. Left kidney presented the same appearance as the right. Liver enlarged and fatty.

There was tubercular ulceration of the vermiform appendix, and a few tubercular ulcers in the small intestine. There were large tubercular ulcerations in the larynx.

CASE 4.

C. S.; age, thirty-five; born in New York; was admitted to the U. S. Marine Hospital, Stapleton, port of New York, on April 6, 1889, and died on June 4, 1889.

Clinical history.—He was discharged improved from this hospital in October, 1888; the diagnosis was "tubercle of lung." On April 6 he was readmitted, when he gave the following history: Has had a steady cough for about a year, with moderate expectoration; has lost thirty pounds in weight during that time; has never had night sweats until the past few nights, and no hæmoptysis.

Physical examination: Age, thirty-five; fairly nourished; hollows under both clavicles; expansion poor; heart apparently normal; dullness on both sides of chest, more marked on right side and extending to the upper border of the third rib; breathing shallow; moist râles over the entire right lung, and bronchial breathing over the left.

April 12.—Has slight diarrhœa.

April 14.—Has a catarrhal condition of fauces and larynx.

May 7.—Had profuse sweats last night.

May 13.—Coughed all night. Excessive expectoration.

May 21.—Coughed all night. Disease appears to be advancing. Very much constipated. Patient gradually became weaker and died on June 4, 1889.

Necropsy (nine hours after death).—External examination. *Rigor mortis* was slight; very great emaciation. There was a large cicatrix on the anterior region of the right leg, also a small cicatrix on the outer side of the left leg. Internal examination showed a tubercular inflammation of the larynx without ulceration. The right lung was bound down by strong fibrinous adhesions and completely honey-combed by cavities; it was impossible to remove it; abscess cavities were about equally distributed through the whole lung structure. Left lung was adherent to all the parietes; the upper portion was studded with cavities and gray tubercle; there was evidence of recent tubercular infiltration in the lower lobe; weight, 690 grams. Heart: All the valves were normal; the muscle looked a little paler than normal; weight, 225 grams. Liver was greatly enlarged, the left lobe extending about 5 inches to the left of sternum; weight, 1,725 grams. Fatty spleen, weight, 207.5 grams. Trabeculæ normal. Splenic pulp softened in several places and very dark in color. Left kidney, weight 163 grams, normal. Right kidney, weight 130 grams, normal. Intestines, normal. Mesenteric glands, slightly enlarged. Brain, not examined.

CASE 5.

J. R. H.; aged thirty-one years; admitted to the U. S. Marine Hospital at Baltimore, Md., from the schooner *Amel a*, January 10, 1889; died January 11, 1889.

Necropsy.—The left lung contained gray and yellow tubercles throughout its entire extent. At the apex in the consolidated area were small cavities, which contained pus and degenerated lung tissue, but no blood. The right lung contained gray and yellow tubercles, but no cavities. Both lungs were bound down by recently formed fibrous bands. The heart presented well-marked embolic myocarditis. Syphilitic aortitis existed at the beginning of the arch. Numerous tubercular ulcers were found in the small intestines. General peritonitis from tubercular deposits existed. The mesenteric glands were enlarged, tubercular and cheesy. The spleen was enlarged and studded with gray and yellow tubercles. Two small syphilitic scars were found on the under surface of the liver.

CASE 6.

G. McL.; aged twenty-four years; native of Nova Scotia; was admitted to U. S. Marine Hospital at Chelsea, Mass., November 25, 1887; died January 11, 1889.

History.—On admission patient had symptoms of tubercle of left lung. Two months later he had several profuse hemorrhages from the left lung, but rallied under the free use of whisky—cod-liver oil not agreeing with him—and improved in health, strength, and general appearance until a few months before death, when tubercle of the peritoneum developed with diarrhœa, soon ending in death.

Necropsy (eight hours after death).—*Rigor mortis* marked; body extremely emaciated. The heart was found dilated; walls thin and flabby; weight, 220 grams. Left lung weighed 290 grams; pleural cavity obliterated; upper portion of lung honey-combed with cavities of various size, while the remainder was thickly studded with gray tubercles, many of which had undergone caseous and calcareous degeneration. Right lung weighed 770 grams; few pleuritic adhesions; a few small cavities containing pus in upper lobe, the remaining lobes being much congested and containing gray tubercles in large numbers. Liver weighed 2,330 grams; enlarged; small tubercular deposit on posterior portion of right lobe. Spleen enlarged, but otherwise normal in appearance; weight, 340 grams. Kidneys same size; each weighed 150 grams; both intensely congested throughout. Scattered patches of tubercular deposit were noticed on the intestinal peritoneum; none on the parietal layer.

CASE 7.

C. M. A.; aged thirty-two years; nativity, Norway; admitted to the marine ward of the German Hospital, Philadelphia, Pa., January 4, 1889; died February 14, 1889.

History.—Several members of his family have died of tubercular disease. He had good health until about two years ago, when he began to cough and expectorate. On admission he had troublesome cough—puriform sputa— hectic fever, and night sweats. Examination of lungs showed dullness extending from the apices downwards, most marked on the left side, with large moist rales. There was bronchial breathing on both sides, but most marked on the left. He suffered continually from dyspnoea, with pain on the right side. At one time it was thought the symptoms indicated an hepatic abscess. An aspirating needle was introduced, but without finding pus. February 12 he began to fail rapidly with symptoms of cardiac weakness, and he died February 14, 1889.

Necropsy (sixteen hours after death).—*Rigor mortis* present. Pleural adhesions were present on both sides. The right pleural cavity contained 300 cubic centimeters of sero-purulent fluid. Right lung weighed 820 grams; left, 840 grams. The lungs, on section, were found generally permeated with a sero-purulent exudate, and in both apices were found cavities. Weight of liver, 2,250 grams; right kidney, 250 grams; left kidney, 245 grams. The spleen weighed 350 grams, and had a granular appearance. The mesenteric glands were enlarged and indurated.

CASE 8.

W. H.; aged forty-seven years; nativity, Massachusetts; admitted to U. S. Marine Hospital, San Francisco, Cal., May 16, 1888; died December 25, 1888.

Necropsy (seven hours after death).—The abdominal cavity contained considerable purulent-looking fluid; there were, however, no signs of peritonitis, with the exception of a deposit of lymph over the surface of the spleen. There was some enlargement of the mesenteric glands. The pericardial cavity contained some fluid. The vessels on the surface of the heart were dilated, and contained many small bubbles of gas. The inner surface of the aorta presented several small patches of calcareous deposit. The valves were normal. The left lung was flattened against the chest wall, allowing the heart to become displaced to the left so that before death its pulsations could be distinguished on a line just inside the nipple in the fourth interspace. The lung on this side was apparently useless, universally adherent and composed of dilated bronchial tubes and tough fibrous tissue, covered by a thickened white pleura. There were numerous deposits of pigment. The right lung was firmly adherent at its apex, where there were several small cavities and an extensive deposit of miliary tubercles. The latter were distributed throughout the lung, but were few in number towards the base.

CASE 9.

J. H. M.; aged thirty-two years; nativity North Carolina; admitted to marine ward, German Hospital, Philadelphia, Pa., June 16, 1888; died September 3, 1888.

History.—When admitted he had malarial fever and was discharged cured of that disease August 10, on which date he was re-admitted with tubercular disease of lungs and bowels. He had persistent diarrhoea, rapid pulse, and temperature varying from 37.4° to 39° with rapid and shallow respiration. The left lung presented the physical signs of tubercular disease. The abdomen was enlarged, painful to the touch, and accumulation of fluid in the peritoneal cavity was diagnosed. Aspiration with a full-sized needle was twice performed, but no fluid was found. His appetite was fair, and he was given nutritious diet with whiskey and ol. morrhuae. The medical treatment was addressed chiefly to the relief of cough, night sweats, and diarrhoea. Death occurred September 13, at 12.15 a. m.

Necropsy (thirty-five hours after death).—Body much emaciated. *Rigor mortis* present.

Right lung weighed 775 grams; left 700 grams. There were old and recent pleuretic adhesions, and hypostatic congestion of both lungs. Both lungs were studded with tubercles but there were no cavities. The heart contained "chicken fat" in both ventricles but was otherwise normal. The abdominal cavity contained 1,500 cubic centimeters of serous fluid. There were strong adhesions between peritoneum and abdominal walls and between the transverse colon and liver. The latter organ weighed 2,160 grams and the surface was dotted with tubercles. The spleen weighed 400 grams and tubercles were noted over its entire contour. The kidneys were somewhat congested. Enlarged lymphatic glands, which had undergone cheesy degeneration, were found surrounding the course of the large abdominal blood vessels. These varied in size from that of a pea to that of a hen's egg. The mucous membrane of the intestines was much congested and its glands were enlarged and ulcerated.

CASE 10.

Empyema.

C. C.; aged thirty-one years; nativity, Norway; admitted to U. S. Marine Hospital, San Francisco, Cal., November 7, 1888; died December 30, 1888.

Necropsy.—The heart contained *ante mortem* clots firmly adhered to the endocardium. The organ presented the appearance of fatty degeneration. The left lung was hard and fibrous, showing many spots of cheesy degeneration; there was a cavity of large size at the apex; this lung was adherent to the chest-wall and diaphragm at every point, with the exception of a portion on the interior and outer surface, where there was a localized empyema. The right lung contained several deposits of miliary tubercles, but the greater part of this lung was in good condition. The liver was small and fibrous, presenting a nutmeg appearance. The kidneys had undergone fatty change. The veins of the mesentery were enlarged and the lymphatic glands hypertrophied.

CASE 11.

J. P.; aged thirty-three years; nativity, Sweden; admitted to U. S. Marine Hospital, San Francisco, Cal., April 3, 1888; died November 15, 1888.

Necropsy (twenty-two hours after death).—The left lung was adherent over the lower lobe to the chest wall and diaphragm; its apex contained several hard nodules containing pus; there were miliary tubercles distributed all through its substance. The right lung was universally adherent; contained numerous miliary tubercles, and a cavity at the apex of about 150 cubic centimeters capacity. The heart was normal in appearance, with the exception of slight thickening of the mitral valves. The intestines were somewhat congested at two points, but were otherwise normal.

CASE 12.

J. R.; aged thirty-one years; nativity, Pennsylvania; admitted to the U. S. Marine Hospital, San Francisco, Cal., February 4, 1889; died February 6, 1889.

History.—During the two days of his residence in the hospital the following symptoms and physical signs were noted: Temperature about 39° C.; breathing rapid; restless and delirious; marked resonance on percussion over both lungs. Auscultation; an abundance of moist rales; breath sounds bronchial.

Necropsy.—The lungs were completely filled with miliary tubercles. There was some slight congestion in posterior portions. There were no cavities. The left lung was extensively adherent to the chest wall. The dura mater was adherent to the skull over a large area. Over the anterior lobes the subarachnoid space contained considerable lymph, presenting from the outside a gelatinous appearance. The vessels of the pia mater were unduly distended. There were no signs of tubercle in the membranes of this organ.

CASE 13.

Cirrhosis—Emphysema.

O. K. ; aged thirty seven ; nativity, New York ; admitted to U. S. Marine Hospital, San Francisco, Cal., July 7, 1888 ; died October 14, 1888.

Necropsy.—Body extremely emaciated. *Rigor* pronounced. Right pleura adherent, not firmly, about apex and upper lobe. Left pleura almost free in the same portion, but strongly attached everywhere else. The general appearance of the lungs was similar on the two sides. There was, but especially in the right lung, an appearance of constriction and nodulation of the lower lobes ; a dense, semi-cartilaginous feel about the constriction, and between them and along free edges of lung the tissue was emphysematous, and the dilated bronchi looked like small abscesses. Both lower lobes were deeply congested, both upper lobes anæmic ; the latter were thickly strewn with miliary tubercles, which had not aggregated in nodules or broken down into cavities. Towards the base of the lungs the tubercles were not nearly so thick. Liver enlarged, deeply congested ; tissue pale, and firm when scraped. Along the ileum opposite the mesenteric attachment were a number of ulcers, occupying, apparently, the position of Peyer's patches. They were deep, with gray sloughy floor and raised edges, and one was semi-necrosed, breaking through on slight traction. The ulcers were rather longitudinal than transverse. The mesenteric glands were not greatly enlarged.

CASE 14.

C. W. : aged thirty-six years ; nativity, Finland ; admitted to U. S. Marine Hospital, San Francisco, Cal., August 29, 1888 ; died September 10, 1888.

This patient presented symptoms of severe sciatica on admission, being unable to move the thigh on the affected side without extreme pain. Hypodermic injections of antipyrine were given at the seat of pain. Two days prior to death, signs of lymphatic inflammation appeared around the upper portion of the thigh, but no fluctuating tumor was present.

Autopsy (twenty hours after death).—Body well developed, but somewhat emaciated. There was a diffuse swelling of the right thigh. This swelling was hard, non-fluctuating. An incision over the sciatic nerve was made, and suppurative lymphangitis was found, involving a few small lymphatic glands. This inflammation could not be traced to the hypodermic punctures. Lungs showed evidence of pleuritis, the right cavity being entirely obliterated. The right lung was completely invaded by yellow tubercle. The left lung was adherent to the chest walls and diaphragm ; its upper lobe was also tuberculous. Heart normal in appearance. A white clot, not very tenacious, was present in the left ventricle, extending into the aorta and adhered but slightly to the ventricle walls. Valves normal. Abdominal organs normal.

CASE 15.

Secondary syph s.

J. M. ; colored ; aged thirty-eight ; a native of Kentucky ; was admitted to the U. S. Marine Hospital, Memphis, Tenn., August 27, 1888.

He had been, previous to his admission, treated as an office patient for secondary syphilis, acute bronchitis, ulcers of the penis, and yellow tubercle of the lung.

History.—Severe cough and pain in chest, dyspnoea, swelling of feet, loss of appetite and strength, and night-sweats. These symptoms were alleviated by treatment. In addition to the above, there was occasionally an attack of diarrhoea and incontinence of urine. Physical examination showed dullness over both lungs, with a tympanitic note at the right apex. There were abundant coarse râles over both lungs, bronchial breathing, and increased vocal fremitus. The case progressed steadily to a fatal termination, which came December 19, 1888.

Necropsy.—No *rigor mortis*. Scars in both groins. Marked emaciation. On section there were tough adhesions of pleural surfaces of right chest. The right lung was entirely gone by suppuration, leaving a large pus cavity. The left was extensively infiltrated with tubercular deposits, which were beginning to soften and suppurate. Both sides of heart filled with an *ante mortem* clot. Other organs normal.

CASE 16.

Suppuration of sacro-iliac joint caused by injury.

G. J.; aged twenty-three; colored; a native of Kentucky; was admitted to hospital June 8, 1888.

History.—The day before his admission, while rolling cotton and carrying sacks of cotton-seed, he felt something give away in his back on the right side. Since, he has felt a constant pain in the ilio-sacral joint; the pain extends around the crest of the ilium to its highest point. At the insertion of the quadratus lumborum muscle is the region of greatest tenderness to pressure. The leg is flexed at the knee and apparently shorter than the left, due to tilting of the pelvis. With rest and hot fomentations the pain disappeared for two weeks, but the foot could not be placed on the floor squarely without leaning the body to the right. July 15 he went to bed with a pain which was greatest in the iliac fossa. Aspiration gave no pus. The belly became swollen and tender. Incision gave exit to about two liters of pus. He died August 3, 1888.

Necropsy.—Body much emaciated and covered with scars. Old pleuritic adhesions. Cavities in both lungs. Recent adhesions in abdomen. Mesenteric glands enlarged. Origin of pus not stated. Tubercular inflammation of sacro-iliac joint; suppuration caused by sprain while lifting.

CASE 17.

L. B.; aged thirty years; nativity, Tennessee; admitted to U. S. Marine Hospital, Cairo, Ill., August 2, 1888, died October 29, 1888.

History.—On admission, that of the progressive emaciation and failure of strength of chronic tuberculosis. The voice was entirely lost during the last four weeks of life.

Necropsy (thirteen hours after death).—*Rigor mortis* absent. Body that of a young muscular negro, much emaciated. Left pleura entirely obliterated. Left lung replaced by a small mass of honeycombed pus, and closely adherent to chest wall. Right lung studded with tuberculous masses throughout, together with pus cavities; weight, 1,300 grams. Heart, hypertrophied; aortic valve, incompetent. Left heart walls much hypertrophied. Right heart walls thinned. Gall bladder, moderately full of dark grumous bile. Liver, friable; otherwise normal; weight, 2,030 grams. Spleen, small. Abdomen, devoid of fat.

CASE 18.

A. B.; aged thirty years; admitted to the U. S. Marine Hospital, Baltimore, Md., from the schooner *Juvenile*, February 19, 1888; died August 5, 1888.

Necropsy.—Slight œdema of the ankles. The left lung was compressed by about 1,500 cubic centimeters of sero-fibrinous fluid in the pleural cavity, which was a product of pleurisy, and contained gray and yellow tubercles, with areas of consolidation and small cavities at the apex. The right lung contained a few gray and yellow tubercles at the apex, associated with small cavities. The liver was fatty and congested. The heart was small and fatty.

CASE 19.

C. B.; mulatto; aged twenty-two; born in Kentucky; admitted to U. S. Marine Hospital, Louisville, Ky., March 20, 1888, with tuberculosis in second stage. Patient had naturally a frail constitution; disease was progressive throughout; died July 1, 1888.

Necropsy (twenty hours after death).—Left lung studded with small cheesy deposits throughout upper, and part of lower, lobe. Bound to chest wall by circumscribed patches of pleuritic adhesion. Right lung adherent to chest wall, and to pericardial sac over large extent. Cavity in whole of upper lobe; remainder of lung filled with tubercular deposits. Liver greatly enlarged and in the usual fatty state. Other organs revealed nothing of unusual interest.

CASE 20.

A. F. A.; aged thirty-two years; nativity, Norway; admitted to the marine ward of the Cleveland City Hospital, Cleveland, Ohio, November 23, 1888; died December 22, 1888.

History.—Upon admission he presented the combination of symptoms characteristic of a typical case of pulmonary tuberculosis in the last stage. No family history of tubercular disease. Accession of the disease had been gradual, commencing with the loss of weight, strength, and appetite, followed by cough. Although the merest glance was sufficient to convince even the unprofessional observer that the patient was near his latter end, still the patient was happy and cheerful and cherished an unwavering conviction that he would recover, which conviction he never once relinquished.

Necropsy (ten hours after death).—Body extremely emaciated. Thorax and abdomen opened. Pleural surfaces generally adherent, except over the inferior lobe of the left lung; the right lung was the one which had undoubtedly been first affected. The superior lobe of the right lung was entirely gone; small cavities in the middle lobe, the upper portion of this lobe being one softened purulent mass; the inferior lobe of the same lung was occupied by softened gray miliary tubercle. Any section through the right lung exuded purulent material. The superior lobe of the left lung was occupied by tubercular deposits, the inferior lobe of the left lung being the only portion that was comparatively healthy and normal. The mesenteric glands were enlarged and indurated by tubercular deposits, and the mucous membrane of the ileum was studded with similar products. The liver was somewhat large and fatty. Other organs seemed normal.

CASE 21.

J. B.; colored; aged twenty-seven years; nativity, Ohio; admitted to the U. S. Marine Hospital, St. Louis, Mo., November 12, 1889; died December 9, 1889.

Necropsy (sixteen hours after death).—*Rigor mortis* present; body emaciated. Pleuræ adherent on both sides to chest wall. Lungs consolidated in the lower lobes and ulcerated in the upper parts, containing several cavities and tubercles undergoing softening. Heart normal; pericardial fluid unusually large in amount. Stomach normal. Liver very much enlarged from congestion and very friable. Spleen, pancreas, and kidneys normal. Peritoneum showed signs of recent inflammation in the upper part of the abdomen. Intestines apparently normal. Mesenteric glands enlarged.

CASE 22.

T. G.; aged forty-four years; nativity, Ohio; admitted to the U. S. Marine Hospital, St. Louis, Mo., July 5, 1888; died July 16, 1888.

History.—When admitted patient was very much emaciated, and complained of severe diarrhœa, pain in chest, slight cough, great debility, etc., and said he had had hæmorrhages from the lungs. Medication had no effect upon the symptoms, and death was hastened through severe exhaustion.

Necropsy (twenty hours after death).—*Rigor mortis* marked; body very much emaciated. Lungs were dark-spotted in color, from coal-dust inhalations presumably; shrunken, congested at apices, where was also found several deposits of small, whitish tubercles, and an œdematous exudation. Heart was normal; left side contracted;

right side soft and flabby and filled with a dark clot. Liver, spleen, stomach, and kidneys, pale in color, but apparently normal in structure. Small intestines deeply injected, and showing evidences of marked inflammation in the lower part of the ileum, the internal surface covered with a grumous, viscid, mucoid material. Large intestines congested and thickened, containing similar material to that in the small intestines. No ulceration was discovered in the intestines. Mesenteric glands enlarged and hardened, containing a grayish fibroid material, which in some glands was seemingly inclined to soften into a yellowish, jelly-like material. Other organs showed nothing pathological.

CASE 23.

W. F.; aged forty-one years; born in Ireland; admitted to the U. S. Marine Hospital, Chicago, Ill., April 10, 1888; died July 7, 1888.

Necropsy (ten hours after death).—Body very much emaciated. *Rigor mortis* well marked. Right pleura adhered to lung at apex; pleural cavity contained 500 cubic centimeters of serum. Upper lobe of right lung full of tubercular deposits and small pus cavities. Lower lobe congested. The pleura of left side adherent over the entire surface of lung. Upper lobe of left lung full of tubercular nodules and pus cavities. Lower lobe same as the other. All the other organs normal.

CASE 24.

H. S.; aged forty years; born in Scotland; admitted to the U. S. Marine Hospital, Chicago, Ill., June 12, 1888; died July 16, 1888.

History.—He was very weak and emaciated when admitted. He was suffering from a very severe diarrhœa and pain in the abdomen; stated that he had been sick eight months with a severe cough. Percussion revealed that the lungs were dull at the apex; the right being dull at the base. Moist râles could be heard over the entire surface of both lungs. He suffered from severe and distressing pain in the stomach, which was increased by pressure. The diarrhœa and the pain were never relieved by medication. He gradually grew worse, and died of inanition.

Necropsy (ten hours after death).—Body very much emaciated. *Rigor mortis* well marked. On opening the chest extensive pleuritic adhesions were found on both sides. The greater part of both lungs were studded with miliary tubercular deposits, some of which were in the suppurative stage. Heart normal. Peritoneum adherent to the intestines by recent inflammatory deposits. Liver slightly enlarged. Spleen and kidneys normal.

CASE 25.

J. G.; aged twenty-seven years; born in New York; admitted to the U. S. Marine Hospital, Chicago, Ill., August 18, 1888; died November 16, 1888.

History.—The patient was first admitted to the hospital for contusion of the side, but soon recovered and left the hospital. When he went away he was troubled with a slight cough, but it did not give him very much discomfort at the time. He was readmitted to the hospital August 18, suffering from a severe cough and high temperature, 39.1° C, but on physical examination no lesion of the lung could be detected, although incipient phthisis was strongly suspected. He did not lose flesh or appetite for some time. A pneumonic consolidation of the lower lobe of right lung was discovered August 27. The temperature began to run very high, and soon the whole lung was involved. The expectoration soon became quite profuse, and the patient began to lose flesh and appetite. He grew worse rapidly, and died of exhaustion.

Necropsy (twelve hours after death).—*Rigor mortis* well marked. Body very much emaciated. On opening the chest the pleuræ of both lungs was found to be adherent. The right lung was tightly bound down, and was with great difficulty removed from the chest for examination. The right lung was studded throughout with miliary tubercles, and the upper lobe contained a cavity which was full of pus. The left

lung was also studded with tubercles. The upper lobe was almost entirely destroyed by suppurative process. The lower lobe was comparatively good. The heart contained a large *ante mortem* clot in the left ventricle. The liver was very much congested and slightly enlarged. The right kidney was congested and enlarged. The capsule was adherent and could not be torn from the body of the kidney. The other organs were normal. Brain not examined.

CASE 26.

F. S. H; aged twenty-seven; nativity, Germany; admitted to marine ward St. Francis Hospital, Galveston, Tex., September 13, 1888; died October 6, 1888.

History.—The patient was admitted to hospital with marked symptoms of tubercle of the lungs. His disease pursued the usual course until about eight days before his death, when, after some exertion, a pneumothorax occurred on left side, causing great dyspnoea and pain. This was soon followed by an acute pleurisy with effusion on left side.

Necropsy (six hours after death).—Body very much emaciated. Left lung was completely collapsed, and its pleural cavity contained about 1,000 cubic centimeters of serous fluid; over the lower part of the parietal and visceral pleura of the same side there was a considerable deposit of lymph of very recent formation. Upper part of left lobe infiltrated with tubercular deposit. Right lung showed tubercular consolidation throughout, with two dry cavities in its upper lobe. All other organs seemed normal.

CASE 27.

P. S.; aged forty-five; nativity, Ireland; admitted to U. S. Marine Hospital, New York, November 23, 1888; died December 17, 1888.

Necropsy (twenty-seven hours after death).—*Rigor mortis* slight; body emaciated; tattoo marks on both arms. Heart muscle flabby, valves normal, arch of aorta atheromatous. Left lung adherent to parietes by recent adhesions, hæmorrhagic pleurisy; whole lung solidified; tuberculous, cheesy masses. Right lung solidified, tubercles of more recent formation. Liver small, contracted, cirrhotic. Abdomen contained large amount of serum. Right kidney pale, and to all appearances normal. Left kidney large, pale, normal texture. Spleen enlarged, softened. Intestines and bladder normal. Other organs not examined.

CASE 28.

M. D.; aged forty-six; nativity, Ireland; admitted to U. S. Marine Hospital, Stapleton, N. Y., November 10, 1888; died December 2, 1888.

Necropsy (eighteen hours after death).—*Rigor mortis* slight; body emaciated. Old fibrous adhesions of both lungs to costal pleura. Pericardium contained considerable fluid. Heart much enlarged, organized lymph on anterior surface. *Ante mortem* clots in right auricle and ventricle. Some thickening and roughness of inner surface of ascending aorta. Lungs: cheesy masses and cavities. Tuberculous nodes perceptible from outer surface of lung. Liver dark, congestion; cirrhotic. Kidneys parenchymatous nephritis. Other organs not examined.

CASE 29.

P. C.; aged fifty; born in Ireland; admitted to the U. S. Marine Hospital, port of New York, November 12, 1887, and died September 8, 1888.

History.—On being admitted he stated that he had not been able to work for a month. Complained of cough, with yellowish expectoration, and pain in his chest and aggravated dyspnoea. Occasional night sweats and diarrhoea. He stated that his mother and father had both died of phthisis. Physical examination revealed light dullness at the apices of both lungs, and moist râles were heard all over the

chest. Bergeon's treatment was adopted, and there was decided improvement under it, the patient gaining 22 pounds, when he was discharged on October 17, 1887, but was readmitted on November 12, 1887, being in very poor health; he gradually became weaker and died on September 8, 1888.

Necropsy (twenty-seven hours after death).—Rigor mortis marked; body emaciated; cicatrix on shin. Thorax and abdomen opened by linear incisions. Pericardial fluid normal; adhesions on post surface due to an attack of rheumatism eighteen months ago. Heart small, contracted; valves normal. Lungs attached to parietes by firm adhesions. Left lung filled with tubercular masses. Right lung contains small cavity. Liver enlarged, hard, and fatty. Mesenteric glands enlarged. Left kidney cirrhotic; cortex destroyed to considerable extent; right kidney in same condition. Spleen enlarged. Bladder normal. Brain not examined.

CASE 30.

C. J.; aged forty-one; born in Virginia; admitted to the U. S. Marine Hospital, port of New York, October 10, 1888, and died December 25, 1888.

History.—On being admitted he complained of dyspnoea cough, and pain in the apex of left lung, also occasional night sweats and steady emaciation. Physical examination showed dullness at apices of both lungs, most marked in the left. Mucous râles were heard throughout the chest. He gradually became weaker, and symptoms of Bright's disease manifested themselves about November 1.

Necropsy (twenty-six hours after death).—Rigor mortis; body of an emaciated mulatto negro. Old pleuritic adhesions of both lungs. Left lung: large cavity at apex. Right lung: cavities and general tuberculous infiltration of both lungs. Pericardium contained about 150 cubic centimeters of serum. Both ventricles of heart dilated; flabby walls in diastole. Liver enlarged, extending over to spleen; fatty. Spleen small, contracted; adherent to large intestine. Both kidneys had diminished; cortical substance, granular appearance. Intestinal glands cheesy; tuberculous. Other organs not examined. Microscopic examination of kidneys showed glomerular nephritis. Many glomeruli destroyed.

CASE 31.

B. M.; aged nineteen years; nativity, Norway; was admitted to the U. S. Marine Hospital, New York, October 16, 1888.

History.—He had been suffering with diarrhoea for past six days; occasionally he passed a little blood. His abdomen was considerably distended but not at all tender. He was much emaciated. On examination of his chest fine, bubbling râles were discovered over both lungs. He was placed on appropriate treatment and improved somewhat. On the 24th his temperature rose to 39°; on the 27th again rose to 39°. An examination of his sputa showed a few tubercular bacilli. His diarrhoea and night sweats continued and on November 5 he died.

Necropsy (eight hours after death).—Body greatly emaciated; tattooing on arms; skin somewhat jaundiced. *Rigor mortis*. Heart normal. Left lung bound by strong fibrinous adhesions to parietes; infiltrated by tubercles. Right lung adherent at apex, infiltrated also. Liver fatty degeneration. Spleen small. Left kidney normal. Right kidney normal. Mesenteric glands enlarged. Entire colon lined by tuberculous ulcers. The coats were almost eaten through in spots, with slight fibrinous exudation on peritoneum over these spots. Ileum congested. Brain: weight, 1,315 grams, normal. Cerebral fluid abundant, yellowish in color.

CASE 32.

W. M.; aged twenty-six years; born in New York; admitted to U. S. Marine Hospital, Stapleton, N. Y., September 15, 1888; died October 19, 1888.

Necropsy (thirty-eight hours after death).—Body greatly emaciated. Right lung

bound to costal parietes by strong fibrinous adhesions; atelectasis and large tuberculous cavity; left lung filled with miliary tubercles. Heart: slight aortitis about the right coronary artery; otherwise normal. Liver: weight 2,860 grams; hypertrophied and fatty. On anterior surface of right lobe a large cicatrix and small cyst, apparently a gumma. Tubercular ulceration of ileum; mesenteric glands caseous; spleen filled with miliary tubercles. Both kidneys parenchymatous, containing tubercles; brain not examined.

CASE 33.

M. F.; aged twenty-six years; nativity, Norway; admitted to U. S. Marine Hospital, Stapleton, N. Y., August 10, 1888; died September 3, 1888.

Necropsy (twenty-eight hours after death).—Rigor mortis absent. Pericardium filled with fluid; dilatation of heart; both sides of heart filled with *ante mortem* clots; valves normal; right lung adherent so much as to be removed with difficulty; lung consolidated; tuberculous masses and ulcerations; liver fatty; spleen enlarged and pigmented; mesenteric glands enlarged; bladder normal; kidneys and brain not examined.

CASE 34.

M. S.; aged twenty-eight years; nativity, Sweden; was admitted to the U. S. Marine Hospital, New York, on March 13, 1888; died October 9, 1888.

History.—Family history good. Had been feeling badly for about a year. On admission he had all the rational and physical signs of phthisis. Put upon malt extract and cod-liver oil. He continued about the same for several months and then, failing rapidly, died on October 9, 1888.

Necropsy.—*Rigor mortis* marked; body of an emaciated adult; right lung adherent by general old pleuritic adhesions, so much so that lung could not be removed; lung filled with tubercular masses in various stages of degeneration; pericardium adherent to costal pleura, covering left lung; left lung adherent also by old adhesion; not removable; also filled with tuberculous masses; heart weighed 350 grams; wall of right ventricle very thin; tricuspid valves normal; dilatation of cavities of right and left ventricles distended with dark blood; liver weighs 2,340 grams; fatty; spleen weighs 278 grams; normal; left kidney lobulated, normal; weight, 150 grams; right kidney lobulated, parenchymatous nephritis, weighs 138 grams; bladder: evidence of chronic cystitis; stomach, pancreas, and intestines normal; brain not examined.

CASE 35.

J. S.; aged thirty-four; nativity, Ireland; was admitted to the U. S. Marine Hospital, New York, March 19, 1888; died September 21, 1888.

History.—Family history negative; previous health good; was taken sick about six weeks ago with pains in chest, cough, and some fever; kept at work until about three weeks previous to admission. On admission, voice husky; some cough; appetite poor; bowels regular; tongue dry, red at tip and edges. Physical examination: Slight relative dullness over a limited portion of upper lobe of right lung; roughened breathing with prolonged expiratory murmur heard front and back; pectoriloquy heard over portions of right lung, with increased vocal fremitus; left lung normal; heart, liver, and spleen normal. His cough and other symptoms continued about the same for some time, and on the 30th he had some hæmoptysis. On June 18 physical examination showed the existence of a cavity at apex of right lung. He gradually failed and died on September 21, 1888.

Necropsy (fifty hours after death).—Rigor mortis slight. Lungs: Right pleural cavity filled with effusion, about 2,000 cubic centimeters in quantity, pressing lung and displacing heart. The right lung is compressed; cheesy degeneration, and bronchi filled with pus. Left lung is compressed, adherent to all parietes; also undergoing cheesy degeneration throughout. Heart valves normal, filled with *post mortem* clots and dilated. Liver: The capsule thickened, showing cicatrices; mesenteric glands

enlarged. Bladder empty. Left testicle shows degeneration of the epididymis. There was epididymitis before death. Right testicle contained a tubercular nodule. Ulcers found on vocal chords. Other organs not examined.

CASE 36.

T. S. G.; aged 33 years; nativity, United States; was admitted to the Marine ward, Sisters' Hospital, Buffalo, N. Y., on the 28th of June, 1888; died November 14, 1888.

Necropsy (eighteen hours after death).—Body greatly emaciated. *Rigor mortis* present. Thorax examined, both lungs adherent; left lung almost completely disorganized, with many small cavities filled with pus and caseous matter; right lung the seat of a few tubercular deposits and hepatized at its lower portion. Heart somewhat enlarged, its cavities filled with clots; the valves were healthy. No other organs examined.

CASE 37.

J. L.; aged twenty-three years; nativity, Louisiana; admitted to the U. S. Marine Hospital, New Orleans, La., October 26, 1888; died December 2, 1888.

History.—He had been sick for over one year with severe cough and great pain over lungs for two months; had been troubled with dysentery; during the past six months he had lost 30 pounds of flesh.

Necropsy (fourteen hours after death).—General appearance: The body that of a young man of medium height and slight frame, showing great emaciation; no *rigor mortis* present. Thorax: Lungs collapsed but little on opening the thoracic cavity; both pleuræ were adherent in places from old and organized adhesions; a small amount of serous fluid in both pleural cavities; both lungs were the seat of tubercles in all stages of cheesy and fatty degeneration, but this condition was best marked on the left side and at the apex, where cavities had already formed. Heart and pericardium: Pericardial cavity contained about 35 cubic centimeters of serous fluid; membrane looked healthy. Heart was normal in size and external appearances. The left ventricle was firm and contracted, the right flabby; both ventricular cavities contained clots, but especially the right one, which contained several large "chicken fat" clots, extending up into the pulmonary artery. The endocardial membrane presented a normal appearance; aorta normal. Abdomen: The organs in the abdominal cavity were normal, with the exception of the kidneys and large intestines. The kidneys were congested. The large intestine was the seat of numerous tubercular ulcerations, the membrane in many places presenting a gangrenous condition. Pelvic cavity: Bladder distended with urine.

CASE 38.

J. C. McC.; aged forty-eight years; nativity, Ohio; admitted to the U. S. Marine Hospital, New Orleans, La., November 8, 1888; died November 14, 1888.

History.—Had been sick for several years with lung trouble and treated for cancer of rectum and Bright's disease. Had been able to work until a few days previous to admission to hospital. When admitted he was too weak to stand; very much emaciated. Had been taking all sorts of medicines until his stomach had ceased to digest anything. No appetite. Expectoration of pus very great. Evidence of cavity in upper lobe of right lung; consolidation in both lungs. Diarrhœa. Irritability of bladder was present and it was sometimes necessary to use catheter. Delirious for three days before death.

Necropsy (fifteen hours after death).—Body extremely emaciated; weighed about 80 pounds. Lungs were bound to chest wall at every point by old adhesions, and filled the cavity; they were studded with gray tubercle; upper lobe of right lung had almost disappeared, leaving only sufficient tissue to form the sides of a large cavity; no signs of any recent hemorrhage. Heart small and pale. Liver large,

light colored, and showing fatty changes. Kidneys very small and pale. Spleen small and granular. Colon and intestines pale, empty; no signs of tubercle. Glands not enlarged. Hemorrhoids of lower bowel. Bladder distended with urine. Brain not examined.

CASE 39.

Perineal abscess.

W. H.; colored; aged twenty-eight years; native of North Carolina; admitted to U. S. Marine Hospital at Boston, September 4, 1888; died October 11, 1888.

History.—Patient was suffering with tuberculosis of the lungs and urethral discharge. The urethral discharge ceased in a few days, and simultaneously pain and difficulty in urinating supervened with swelling in the course of the urethra about the junction of the scrotum in front. This was incised, giving exit to an accumulation of pus and some very fetid gas. The same day gangrene of the scrotum ensued, and was treated by free incisions. Pus and gas were evacuated by an incision just within the right anterior superior iliac spine, caused by extension of the gangrene along cellular tissues from the scrotum. The lower part of the scrotum sloughed off and urine was passed through this opening as well as through the natural channel. Death resulted from exhaustion.

Necropsy (eight hours after death).—*Rigor mortis* marked; body emaciated; rather more than normal amount of pericardial fluid; heart weighed 330 grams, normal. Left lung weighed 820 grams; pleural cavity obliterated; lung studded with gray tubercles; two cavities in apex. Right lung weighed 520 grams; no adhesions; considerable congestion, and a few tubercles in the upper and middle lobes. The sloughing of the scrotum did not open the left tunica vaginalis, but the right testicle was completely exposed. Probe could be passed from opening in scrotum to that at spine of ilium. An opening in the membranous portion of the urethra was discovered communicating with a large abscess which extended back to the right tuber ischii and in front to scrotum. In front of this opening the urethra contained much cicatricial tissue, but the canal was not sufficiently narrowed to prevent the passage of urine.

CASE 40.

J. H. W.; aged twenty-nine years; native of Maine; was admitted to the U. S. Marine Hospital at Chelsea, Mass., April 16, 1889; died May 13.

History.—The patient had been treated in this hospital about one year before for tubercle of the lungs, and was discharged improved; but at the time of his last admission it was evident that the disease had made rapid progress. Death was the immediate result of the exhaustion incident to the bursting of an abscess of the right lung.

Necropsy (seven hours after death).—Cadaveric rigidity well marked. Body considerably emaciated. Heart weighed 325 grams; contained a large *ante mortem* clot in right ventricle. Left lung weighed 850 grams; extensively adherent to the chest wall; stuffed with gray tubercle, and contained several small abscesses filled with pus and cheesy matter. Right lung weighed 1,030 grams; impregnated throughout with tubercle; upper posterior part of lower lobe was the seat of a large abscess with gangrenous walls, capacity about 400 cubic centimeters, and contained some very offensive pus. In the posterior part of the superior lobe was another abscess about one-third the size of the preceding, and several others of smaller size were distributed through various parts of the lung.

CASE 41.

J. R.; aged forty-one years; native of Newfoundland; was admitted to the U. S. Marine Hospital at Chelsea, Mass., April 12, 1889; died May 29.

History.—On admission the patient was suffering with the usual symptoms of ad-

vanced tuberculosis of the lungs. The disease progressed steadily, œdema of the lower extremities occurred, and death resulted from asthenia.

Necropsy (eighteen hours after death).—Rigor mortis well established; body considerably emaciated. Heart weighed 325 grams; flabby; otherwise normal. Left lung weighed 1,240 grams; studded with gray tubercles of various sizes, and cavities, most of which were small and contained cheesy pus. The only resemblance to normal tissue was a small area along the front border. Right lung weighed 1,880 grams; same as the left lung, only the entire organ was involved; abscesses larger and contained a small amount of fluid pus of an offensive odor: extensive pleuritic adhesions on both sides. Liver and spleen pale, otherwise normal in appearance. Left kidney weighed 210 grams; right, 205 grams; capsules easily removed, showing congestion on the surface; more marked internally, and to a greater extent in the right than in the left. No tubercle found except in the lungs, pleuræ, and mediastinal glands.

CASE 42.

Chronic nephritis.

J. A.; aged fifty years; native of Massachusetts: was admitted to U. S. Marine Hospital at Chelsea, Mass., May 22, 1888; died March 5, 1889.

History.—At the time of admission patient was suffering with the usual symptoms of pulmonary tuberclosis; there was no improvement under treatment, and symptoms of kidney disease, œdema of the face and lower extremities were manifest before death.

Necropsy.—No cadaveric rigidity; body moderately emaciated. Heart weighed 330 grams; slightly hypertrophied. The origin and first portion of the arch of the aorta contained atheromatous patches, one being 2 centimeters in diameter. The heart valves were normal. Right lung weighed 560 grams; intimately adherent to chest walls posteriorly and all around the apex; tubercle scattered throughout the lung substance; upper lobe contained two large cavities separated by a bridge of tissue, each with a capacity of about 150 cubic centimeters, and filled with pus and disintegrated tissue. Left lung weighed 605 grams; adherent posteriorly; small cavity in apex and tubercles disseminated throughout lung substance, except in its lower posterior border, where it was deposited in patches. Both lungs œdematous. Left kidney weighed 165 grams; right kidney, 140 grams; capsules adherent; surfaces depressed in places; internally mottled alternately red and yellow; apparently increase of connective tissue. No tubercle could be detected. Spleen normal in size and color, but its capsules contained numerous small tubercles.

CASE 43.

A. H.; colored; age, twenty-three years; a native of the West Indies; was admitted to the U. S. Marine Hospital at Stapleton, N. Y., on February 28, 1889, and the diagnosis of tubercle of the lung made.

Synopsis of the clinical history.—The personal history of the patient, before his admission, was typical of the invasion of pulmonary tuberculosis. On admission, the physical examination showed that both lungs were involved, the condition of the left being the more serious. On March 17, the patient complained of a severe headache, which did not yield to treatment. On March 20, the following note was made: "Has experienced sudden loss of power in left arm and leg. There is a total absence of all prehensile power in the left hand. Pupils are sensitive to light and similar in appearance. Drags the left foot after him in walking. No paralysis of sensation and no hyperæsthesia. Admits former syphilis this morning, though previously he had denied it." Patient was placed on mixed treatment, and on March 23 the power in left leg was improved. The condition of the left arm remained unchanged. Persistent headache was present for four weeks preceding death. On April 6 the pupils

were dilated and responded slowly to light, and the patient was somnolent. The pulse was weak and rapid. On April 10 the patient's temperature, which previously had not risen above 37.8° , rose to 38.8° , and notwithstanding the administration of antipyretic remedies it rose gradually to 40.4° on April 13. The respirations were hurried and the pulse weak and rapid. The patient gradually sank, and died at 12.30 a. m., April 14, 1889.

Necropsy (thirty-four hours after death).—The body was emaciated, weighing about 100 pounds. *Rigor mortis* was present. Upon opening the abdomen the peritoneum was found to be in a normal condition. The diaphragm was at the level of the fifth rib. The liver, when removed, was found to weigh 1,230 grams. Disseminated patches of both cirrhotic and fatty degeneration was found throughout the organ. The capsule was more adherent than normal. Spleen: This organ was bound down by firm old adhesions. It weighed 225 grams, and on section presented many well-defined tubercular nodules. It was slightly cirrhotic. Left kidney, weight 145 grams. The capsule was adherent. Extensive interstitial degeneration was present, the substance of the kidney in some portions being as tough as cartilage. Parenchymatous degeneration to a more limited degree was also present. An abscess, probably tubercular, was found among the straight tubules at the lower portion. Right kidney, weight 149 grams. Found to be in the same condition as the left, with an abscess, apparently tubercular, in one of the pyramids. Thorax: Right lung, weight 465 grams. The lung was not adherent. The lower portion was consolidated. Incisions into it revealed widely disseminated tubercular nodules throughout the organ. The left lung was very much contracted and so bound down by old adhesions that it was impossible to remove it without tearing it; incisions made into it, showed it to be in a condition of extensive fibroid degeneration and densely infiltrated with tuberculous matter. Heart, weight 280 grams, apparently normal. A swelling was noticed on the right side of the vertebral column at the junction of the fourth and fifth dorsal vertebræ. On puncturing it about 40 cubic centimeters of thick pus escaped. Examination of the abscess cavity was postponed until after the removal of the spinal cord. Head: Upon the removal of the calvarium the dura mater was found in a normal condition. The blood-vessels of the arachnoid membrane over both hemispheres of the cerebrum were much congested, and the membrane was inflamed throughout, presenting a granular feel to the touch. It contained a number of well-defined nodules having the appearance of tubercle. The membrane was considerably thickened. The anterior and superior surface of the left ventricle presented several nodules, apparently tubercular. Between the lenticular nucleus and the internal capsule, nodules, apparently tubercular, were found, and the tissue in which they were situated was softened, probably as the result of hemorrhage, due to tubercular infiltration of the wall of the artery. In the left hemisphere an indurated nodule about the size of a pea was found, encapsulated in the gray matter of the frontal region. A similar nodule was found in the white matter of the occipital lobe. Just over the fissure of sylvius, a nodule, the same size, but very much softened and surrounded by a well-marked inflammatory zone, was observed. The vessels at the base of the brain were apparently normal. Right side: On the inner side of the right hemisphere, just above the internal capsule, a large almond-shaped focus of tubercular softening, distinctly encapsulated, about $3\frac{1}{2}$ by $1\frac{1}{2}$ centimeters in measurement and containing great many distinct nodules was seen. In the right fissure of sylvius, surrounding a vessel, was observed an indurated patch of tubercular character. The corpus callosum was softened, as was also the inferior wall of the right lateral ventricle.

Cerebellum: The membrane covering the cerebellum was adherent and granular, containing nodules which were apparently tubercular. The surface of the left side was considerably softened in places. Cord: Upon removal of the cord the lower portion of the body of the fourth dorsal and the upper portion of the body of the fifth dorsal vertebræ were found carious. The intervertebral cartilage was softened and an abscess cavity was formed. The abscess was evidently of tubercular origin.

Around the point of abscess formation the cord appeared softened, but no pus was found within the membrane. The posterior portion of the cord was congested and inflamed.

Microscopical examination: Sections made from the various tumors show the tumors to be composed of granulation tissue, the center cheesy and surrounded by a zone of leucocytes, taking on a deep stain, and among these there were a great number of giant cells. In a few instances the origin could be traced to the blood-vessel supplying that region. In the fissure of sylvius there was a considerable deposit of inflammatory exudate, besides several small punctate hemorrhages. The meninges contained a considerable amount of inflammatory exudate, having quite an amount of giant cells.

CASE 44.

F. B.; colored; aged thirty-seven years; a native of Louisiana; was admitted to the U. S. Marine Hospital, Memphis, Tenn., July 8, 1888; died February 12, 1889.

History.—Cough for one year; pain in chest, first on left side; poor appetite; loss of flesh and strength. She was made comfortable by treatment, and her decline, though gradual, was alleviated in such a way as to cause her very little suffering.

Neeropsy showed both lungs to contain large cavities; in fact no passably sound lung tissue remained.

CASE 45.

Large white kidney.

C. A. S.; aged forty-three years; nativity, Ohio; admitted to the U. S. Marine Hospital, Chicago, Ill., November 13, 1888; died January 23, 1889.

History.—Patient was transferred to this hospital from Detroit, under the diagnosis of osteoma of the neck. He presented on admission a hard swelling at the back of the neck, smooth, flat, non-elastic, and very tender to the touch. His head was thrown forward, the chin approaching the sternum, the neck being perfectly immovable. A history of syphilis was given. No injury had been received. Patient suffered from severe headaches, coughed considerably, and expectorated thick glairy mucus. Examination of the lungs showed some consolidation with moist rales. Urine contained albumen. The course of the sickness was variable, he at times growing worse for a few days, with no appreciable cause for it, and then recovering in the same unexplained manner. The anti-syphilitics were given; the battery was applied to the spinal column; strychnia and Fowler's solution of arsenic were administered by the mouth, all having little effect. His capricious appetite was ignored; tonics were given; cough was relieved by anodynes; and later stimulants were administered by the mouth and rectum. A large hemorrhoid became inflamed, and was incised, liberating about 15 cubic centimeters of very fetid pus.

Neeropsy (nineteen hours after death).—*Rigor mortis* well developed; body much emaciated, pericardium contained 50 cubic centimeters of clear serum; heart weighed 270 grams; cusps of aortic valves were adherent to one another at the edges, making them stand out instead of lying flat against the wall of the artery. A few very small calcareous spots were found in these valves. Weight of right lung, 670 grams; of left lung, 1 kilo; both lungs showed old pleuritic adhesions, especially about apices: patches of consolidation, with disintegrating tubercular foci, were distributed through almost the entire tissue. One cavity as large as a butternut, and nearly that shape, was found in the upper lobe of the right lung; a smaller cavity on the left side at apex. Liver was well advanced in cirrhotic change, with a few atheromatous vessels; weight, 2,040 grams. Spleen normal, weighing 200 grams. Kidneys were both fine examples of the large white kidney; the right weighed 210 grams, the left 240 grams. The stomach and intestines, aside from slight congestion, were normal. Bladder contained about 50 cubic centimeters of urine. Brain weighed 1,270 grams; membranes were much congested; punctate hemorrhages appeared on section; no fluid in the ventricles, and

tissue was normal; on dissection at the back of the neck the transverse processes, spinous processes, and laminae of the upper cervical region, especially the atlas and axis, were found to be abnormally developed, standing out more prominently than is customary. The muscles and tendons about these bones appeared rigid and tense. The anterior curvature of the spine in the cervical region was much exaggerated, while just below the junction of the spine with the cranium the former made a sharp curve, with its convexity backward, thereby accounting for the peculiar position in which the patient carried his head. There was no bony outgrowth. The spinal cord appeared normal. Cause of death, tuberculosis of lungs, and large white kidneys.

CASE 46.

Secondary syphilis.

C. A.; aged forty years; nativity, Denmark; admitted to the U. S. Marine Hospital, Chicago, Ill., May 13, 1889; died May 29, 1889.

History.—Patient had been treated here three years before for tuberculosis of the lungs. Three months prior to his last admission he bit his tongue, this being followed by a local sore, which spread around the right side and point. The sore was ragged, indurated, and discharged a thin, offensive secretion. The tongue was much thickened, so as to interfere with deglutition and speech. The pharynx was uninvolved. He was far advanced in pulmonary tuberculosis when he entered, the right lung being especially involved. He failed rapidly from cough, hæmoptysis, and inability to swallow sufficient nourishment. Anti-syphilitics were given, the mercury by inunction; cod-liver oil and whisky formed the chief medicines directed toward the condition of the lungs. A disinfectant mouth-wash relieved the fetor of the breath. Whisky and hot milk were given the last week or two. The condition of the tongue had improved somewhat under the treatment. Delirium and carphologia set in about a week or ten days before death, and continued to the end.

Necropsy (seventeen hours after death).—*Rigor mortis* moderately well developed. On removing the calvarium, considerable serum escaped. The cortical vessels were injected, and the pia mater contained numerous miliary tubercles along the superior border of the longitudinal fissure, and along the fissure of sylvius at the base. Softening of the brain tissue had taken place underneath the tubercles. The ventricles were filled with serum. On the pons varolii and peduncles of the cerebellum were found two small tuberculous nodules. The entire brain substance was becoming softened. The brain weighed 1,620 grams. The pericardium contained 75 cubic centimeters of clear serum. The heart was dilated, somewhat fatty, and weighed 410 grams. The right lung weighed 1,080 grams; was completely filled with tubercles, which were breaking down. The entire apex and posterior surface remained in the chest when the lung was removed, showing numerous small abscesses, and one large one at the apex containing thick yellow pus. The left lung was everywhere adherent. It weighed 1,030 grams, and was also filled with miliary tubercles, which had not advanced quite so far. The liver was large, firm, nutmeg. The weight of it was 1,940 grams. The spleen was enlarged, weighing 330 grams, but appeared normal. The right kidney weighed 250 grams, the left 270 grams, both normal; stomach and intestines were normal. The bladder was empty.

CASE 47.

H. L.; aged thirty-nine years; nativity, Scotland; admitted to the U. S. Marine Hospital, Chicago, Ill., November 13, 1888; died May 23, 1889.

History.—Patient was one of a number transferred from the U. S. Marine Hospital at Detroit, Mich. Physical examination showed him to be well advanced in pulmonary tuberculosis, the emaciation and pallor being especially marked. The treatment comprised cod-liver oil, whisky, malt, creosote, the latter of which he could not take on account of an uneasy feeling it produced in the bowels. Sedatives were required in the later stages.

Necropsy (fourteen hours after death).—Rigor mortis feeble. The lungs were both filled with tubercles which were breaking down into small cavities. No healthy spot of tissue was visible. Left lung weighed 940 grams. Right lung weighed 820 grams. Heart weighed 460 grams, and was largely filled with *post-mortem* clots, one extending far into the aorta; several perforations were found in the aortic and pulmonary valves. The pericardial cavity was entirely obliterated by adhesions resulting from some former pericarditis. The liver weighed 720 grams and was of the nutmeg character. Right and left kidneys each weighed 220 grams, normal. The spleen weighed 250 grams, was congested and soft. The intestines were normal. The bladder contained 50 cubic centimeters of urine.

CASE 48.

J. D.; aged 35 years; nativity, Connecticut; admitted to the U. S. Marine Hospital, Chicago, Ill., March 6, 1889; died March 10, 1889.

History.—Patient was carried in on a stretcher, being in the last stages of pulmonary tuberculosis. He was encouraged to take milk with stimulants, and anodynes were given to relieve his cough and induce sleep. After being in hospital four days he died.

Necropsy (eight hours after death).—Rigor mortis slight; lungs were filled with tuberculous patches, with cavities here and there, one at the right apex being the size of a small orange; lungs were adherent to chest walls throughout; the heart was filled with clots, evidently formed during the throes of death, as they were intimately entangled with the cordæ tendinæ and muscle walls inside the cavities; the heart weighed 270 grams; liver weighed 1,250 grams, soft and congested; spleen was in a similar condition, weighing 120 grams; kidneys normal, weighing 160 grams each; intestines normal.

CASE 49.

P. B.; aged thirty-one years; nativity, Ireland; admitted to the U. S. Marine Hospital, Chicago, Ill., May 14, 1888; readmitted January 15, 1889; died February 9, 1889.

History.—Patient had been in hospital several times. On entering in May, 1889, his chief affection was secondary syphilis, for which he was treated by iodide of potassium and mercury. Later, tuberculosis of the lungs developed, and in time became the more serious of the two diseases. For this reason the diagnosis was changed January 15, 1889, he being readmitted for the latter trouble. Cod-liver oil and whisky, nutritious diet, stimulants, exercise, and, later, sedatives were employed. The course of the disease was steadily progressive, from bad to worse, and patient died February 9, 1889.

Necropsy (fourteen hours after death).—Rigor mortis well developed; body considerably emaciated; lungs were literally riddled with tubercular deposit, adherent throughout entire extent, and almost devoid of air. The heart was normal; liver, nutmeg. Other organs were not examined.

CASE 50.

Lobar pneumonia.

F. S.; aged forty-nine years; nativity, Virginia; admitted to the U. S. Marine Hospital, at New Orleans, La., January 21, 1889, for hysteria; re-admitted January 26, 1889, for lobar pneumonia and tubercle of lungs; died January 30, 1889.

History.—Nothing positive could be made of the case when first seen, but as he was exceedingly restless, etc., the diagnosis of hysteria was made. In a few days, however, tubercle was detected, and symptoms of lobar pneumonia. His pulse was full but not strong, and his heart sounds, though heard distinctly, were muffled and supposed to be due to pericardial effusion. During the last two days of his life his pulse was intermittent, weak, and frequent, his respirations were 36 to the minute, and his temperature was 40° C.

Necropsy.—External appearances: The body was large, strongly built, and well nourished. There were numerous India-ink figures, etc. Thorax: The cartilages of ribs were ossified. There was no extra fluid in pleural sacks, but both pleuræ were strongly adherent to chest walls and the lung adhesions were so resistant that the substance of the lungs was torn in removing them. Right lung was in the third or suppurative stage of pneumouia; but tubercles, though hard to define, were undoubtedly present. Left lung showed evidence of hepatization in posterior part of lower lobe, but the rest of the lung was oedematous. Heart: Pericardial sack strongly adherent and could not be torn from heart muscle. Heart was surrounded with fat and slightly hypertrophied. Its tissue seemed to be normal and the valves in good condition, but around the base of the valves the margins of the auriculo-ventricular openings there were rings of calcareous deposits. The coronary arteries were atheromatous. Liver: This organ was large, congested, and contained tubercles. Both kidneys were very large, engorged with blood, and evidently tubercular. Left kidney contained a cyst about the size of a hazelnut. Mesenteric glands were enlarged and caseous.

CASE 51.

S. K.; aged thirty-two years; nativity, Louisiana; admitted to the U. S. Marine Hospital at New Orleans, La., April 26, 1889; died May 23, 1889.

History.—On admission to hospital the patient gave a history of having suffered from frequent attacks of bronchitis for the last few months; he had had constant cough and expectoration, and had lost flesh and strength. When admitted his general condition was fair; he was evidently emaciated, but the cough was slight and expectoration not profuse; appetite was good. Physical examination showed an area of consolidation in upper lobe of left lung, and the presence of a cavity at the apex. Mucous rales could be heard throughout both lungs. For some days the patient seemed to do pretty well, but he soon showed signs of the development of an acute tuberculosis, viz, high fever, rapid pulse, great prostration, profuse sweating, and fine bubbling rales heard everywhere over the chest. This condition continued for a week, the patient rapidly growing weaker and finally succumbing to the disease May 23, 1889, at 4 p. m.

Necropsy (eighteen hours after death).—General appearance: Body that of a colored man, short in stature, of slight frame, and showing considerable emaciation. Thorax: On opening the thoracic cavity both lungs were found free except over left apex, where the pleural surfaces were united by old adhesions. No fluid in pleural cavity. The whole pulmonary surface was covered with grayish tubercular nodules about 1 millimeter in diameter; on section, these nodules were found disseminated throughout the whole parenchyma; at left apex there was a cavity 3 centimeters in diameter with thin collapsed walls. The pulmonary tissue surrounding and below this cavity was consolidated. Upper half of right upper lobe was also consolidated. Posterior surface of lungs was in a state of hypostatic congestion. Heart and pericardium: The pericardial sac contained about 50 cubic centimeters of clear serous fluid. Heart was small, both ventricles were filled with dark clots. Leaflets of mitral valves somewhat thickened and opaque. The aortic and pulmonary valves normal. A few fenestrations found along the free edge of right aortic semilunar valve. The tricuspid valve normal. Abdominal cavity: Liver slightly reduced in size, spleen enlarged, capsule opaque, pulp soft and friable. Kidneys: Both kidneys congested, capsule strips off easily. Bladder empty. Brain not examined.

CASE 52.

E. J. T.; aged thirty-one years; nativity, United States; admitted to the U. S. Marine Hospital at New Orleans, La., March 14, 1889; died June 1, 1889.

History.—He was in hospital for several months during 1888 suffering from phthisis pulmonalis and improved so much that he went out and resumed his usual work.

He soon broke down, however, and again applied for admission to hospital, and his condition had become so bad that it was impossible to do much for him, and he sank rapidly.

Necropsy.—His body was of medium size, but greatly emaciated. Right pleura was firmly adherent to chest walls and the left one strongly bound down in places by old bands of lymph. The lungs were studded with tubercles and numerous small abscesses were present in both of them. The heart was small, its tissues soft and flabby; but its valves were in good condition. Liver was hard and granular and presumed to be undergoing cirrhosis. Nothing abnormal seen in kidneys and other organs of abdominal region.

CASE 53.

W. S.; aged twenty-one years; nativity, Louisiana; admitted to the U. S. Marine Hospital at New Orleans, La., January 25, 1889; died February 5, 1889.

History.—He had been under treatment for phthisis pulmonalis in the hospital and dispensary for about nine months, but he failed rapidly, and when admitted to hospital in January was too weak to sit up.

Necropsy.—Body small and emaciated. Thoracic cavity contained about 1,000 cubic centimeters of pus. The right lung was broken down into pus, hardly any tissue being left. Left pleura was adherent throughout and the left lung studded with tubercles. The pericardial sack contained 100 cubic centimeters of amber-colored fluid. The heart was small, but the valves were normal. The liver was soft and dark, but not increased in size. The kidneys were normal in size and appearance. The spleen was very small and dark in color.

CASE 54.

J. T.; aged fifty-three years; nativity, Ireland; admitted to the U. S. Marine Hospital at New Orleans, La., January 3, 1889; died March 5, 1889.

History.—When admitted the patient had evidently been suffering from phthisis pulmonalis for some time; he was emaciated, very weak, and suffered from all the symptoms of tubercle; his breath and expectoration showed that his lungs were becoming gangrenous, and the constant diarrhœa gave evidence of a tubercular condition of his intestines. He continued to fail rapidly. The treatment was directed towards making him more comfortable and rendering his discharges, etc., inoffensive to the other patients.

Necropsy.—Thoracic cavity: The pericardial fluid was about normal in quantity. The heart was small and the valves were healthy looking. Lungs: The left pleura was adherent, but the right one was perfectly free. Right lung congested and contained tubercle chiefly in the inflammatory stage, though there were signs of ulcerative and destructive changes going on. The left lung contained an abscess which involved the entire upper lobe and the rest of the lung was infiltrated with tubercles which were undergoing destructive changes. The liver was cirrhotic. The spleen about three times its normal size and very much congested and softened. The kidneys were large and pale; the capsule came off easily; the cortical line was well marked. Intestines did not reveal any tubercles and contained only slimy mucous, etc. Mesenteric glands were enlarged and caseous.

CASE 55.

A. McC.; aged twenty-one years; nativity, Georgia; admitted to the U. S. Marine Hospital at Louisville, Ky., February 26, 1889; died March 2, 1889.

History.—On admission there were symptoms of tubercle of lung in an advanced stage with consolidation, and the formation of cavities was plainly marked.

Necropsy (eighteen hours after death).—Heart pale, flabby, and the seat of eccentric hypertrophy; large ante-mortem clots were found in the cavities of both sides; valves seemed normal; pericardial fluid increased to about 100 cubic centimeters.

Lungs: The parietal and visceral layers of the two pleuræ were adherent throughout; left lung infiltrated with tuberculous deposits; cavity in apex as large as a goose egg, filled with a curdy puriform fluid, and numerous (fifteen to twenty) smaller cavities were disseminated through its lobes. The whole lung sunk in water. Right lung in almost the same condition. Abdominal cavity: Masses of tubercle in the state of caseous degeneration, and varying in size from a beechnut to a walnut were found in the mesentery, spleen, and pancreas. Liver and kidneys appeared normal.

CASE 56.

I. B.; aged twenty-eight years; nativity, Kentucky; admitted to the U. S. Marine Hospital at Louisville, Ky., January 26, 1889; died May 29, 1889.

History.—A diagnosis of acute bronchitis was made upon admission in the case of this patient. He was re-admitted with the diagnosis of tubercle of lung, March 30.

Necropsy (six hours after death).—Body of a colored male, much emaciated. *Rigor mortis* well marked. Both lungs were found firmly bound to the thoracic walls, diaphragm, and pericardium by old adhesions. The left lung was solidified and filled with tubercles, except a small portion along the border of the lower lobe; it contained numerous small cavities. The right lung was still more completely solidified. The liver was friable and fatty. The kidneys were the seat of parenchymatous degeneration.

CASE 57.

T. H.; aged thirty-nine years; nativity, New York; was admitted to the U. S. Marine Hospital, Cairo, Ill., January 22, 1889; died March 29, 1889.

History that of progressive emaciation. He was tormented with an incorrigible diarrhœa.

Necropsy (five hours after death).—Body that of a young man emaciated. *Rigor mortis* absent. Fæcal odor marked. Heart containing organized lymph and large ante-mortem clots; muscles softened. Left lung, pus cavities throughout; pleuræ obliterated. Right lung, hepatized throughout, superior and middle lobes containing pus and breaking down with cavities throughout. Liver, enlarged, flabby; weight, 2,250 grams; superior surface closely adherent to diaphragm. Spleen, granular and fatty, one section showing pus. Kidneys congested. Intestines studded with tubercles.

CASE 58.

R. T.; aged twenty-two years; nativity, Maryland; admitted to marine ward of St. Mary's Infirmary, Galveston, Tex., with signs of consolidation at apex of left lung on September 3, 1888, and died February 23, 1889.

History.—In about one month after admission symptoms of tubercular disease of the intestines came on; abdominal pain and diarrhœa were prominent symptoms.

Necropsy (fourteen hours after death).—Body very much emaciated. Left lung: entire upper lobe consolidated; no cavities, but there were several large tubercular nodules not yet broken down. Right lung: upper and middle lobes considerably infiltrated; no cavities. Heart atrophied, valves normal; about 50 cubic centimeters fluid in pericardium. Liver pale and small. Intestines dotted with tubercular ulcers; mesenteric glands very much enlarged and matted together.

CASE 59.

M. B.; aged thirty years; nativity, South Carolina; was admitted to the marine ward of City Hospital, Charleston, S. C., February 28, 1889, and died April 2, 1889.

History.—Family history good; had been ill for several months; examination revealed the gross signs of the third stage of the disease, both lungs being infiltrated, the left cavernous. The usual treatment and result in such cases in this climate followed.

Necropsy.—*Rigor*; great emaciation; anterior chest wall removed; pleural generally adherent; both lungs thoroughly disintegrated and full of pus.

CASE 60.

T. B.; aged twenty-three years; nativity, Virginia; admitted to marine ward of St. Vincent Hospital, Norfolk, Va., December 21, 1888; died May 5, 1889.

History.—This case had an inherited tubercular tendency, and on admission had well-marked cavities in both lungs. He remained in hospital some four and a half months, gradually growing weaker, and finally died of exhaustion.

Necropsy (seven hours after death).—Body emaciated; *rigor mortis* well marked. Heart normal and surrounded by fat. The lungs were filled with cavities of various sizes, being more numerous in the upper and middle lobes. The lung tissue was almost entirely destroyed. The cavities all contained pus and débris of lung tissue; the bronchi were partially filled with the same material. The other organs were not examined.

CASE 61.

C. M.; aged thirty-two years; nativity, New York; admitted to marine ward of St. Vincent's Hospital, Norfolk, Va., December 24, 1888; died January 11, 1889.

History.—This patient was brought to the hospital after having fallen overboard from a vessel, and having become thoroughly chilled. He had a bronchitis, and upon physical examination dullness over the apices of both lungs was found. His temperature ran up to 39° C., and he rapidly sank, dying of exhaustion in less than three weeks after admission.

Necropsy (thirty hours after death).—*Rigor mortis* well marked; body emaciated. Left lung bound down by extensive old pleuritic adhesions; color grayish; tubercular deposits were scattered throughout the substance of both lungs, and small cavities were found in the upper lobes on each side. Extensive destruction of lung tissue had taken place; other organs appeared normal.

CASE 62.

W. P.; aged twenty-four years; nativity, Scotland; admitted to U. S. Marine Hospital, San Francisco, Cal., October 29, 1888; died November 16, 1888.

Necropsy (sixteen hours after death).—The lungs only were examined. The lungs were slightly adherent at their posterior surfaces. They were very light in color anteriorly, but dark-colored in the most dependent portions. They were both thickly studded with miliary tubercles in every direction.

CASE 63.

Lobar pneumonia.

A. E.; aged thirty-six years; nativity, Sweden; admitted to U. S. Marine Hospital, San Francisco, Cal., January 17, 1889; died April 7, 1889.

Necropsy.—Body emaciated; slight general edema. The apex of the left lung was adherent to the parietal pleura and contained a cavity the size of a small egg; the rest of upper lobe was full of discrete tubercle. The other lobe was cedematous, emphysematous. Right lung was a solid mass of gray hepatization, except the anterior edges of the lobes. No tubercle seen. This lung was adherent posteriorly. The pericardium contained about 100 cubic centimeters of serum; heart very very much dilated, fatty, and flabby.

CASE 64.

L. N.; aged twenty-five years; nativity, Norway: admitted to U. S. Marine Hospital, San Francisco, Cal., December 19, 1888; died January 17, 1889.

Necropsy (eleven hours after death).—Some *rigor*. Extreme emaciation. Left pleura adherent almost everywhere. The lung was a mass of caseous matter, with large cavity the size of an orange in its apex, and numerous smaller ones in other

parts. Right pleura likewise adherent, and the upper half of this lung in a similar condition to the other. Throughout lower half of right lung were caseous nodules, probably tuberculous. Liver enlarged, firm, with nutmeg section. Spleen enlarged somewhat firmer than usual. Kidneys enlarged appreciably, congested, pale on scraped section, pyramids very firm and white, cortex somewhat fatty. Both organs slightly lobulated. Peritoneal cavity contained about 200 cubic centimeters serum; there were a score or more inflamed and ulcerated patches along the ileum, and areas of inflammatory infiltration in certain patches of Peyer.

CASE 65.

J. A.; aged twenty-six years; nativity, Sweden; admitted to U. S. Marine Hospital, San Francisco, Cal., February 5, 1889; died February 14, 1889.

Necropsy.—Both lungs were filled with tubercles, the number increasing from base to apex. At the apex of the right there were strong pleuritic adhesions, and in the lung tissue numerous small cavities. The heart was normal; the liver of nutmeg appearance, with an apparent increase of fibrous tissue.

CASE 66.

E. S.; aged thirty-four years; nativity, Finland; admitted to the U. S. Marine Hospital, San Francisco, Cal., March 27, 1889; died April 21, 1889.

Necropsy.—The dura mater was thickened and opaque, the thickening being especially marked along the course of the meningeal arteries. There was a long *antemortem* clot in the longitudinal sinus. The left lung was attached slightly to the chest wall, and contained tubercular nodules scattered through its entire substance. The right lung was also adherent; its lower two-thirds swollen and hard; its cut surface gray in color and presenting the appearance of the third stage of lobar pneumonia. The liver was enlarged; its peritoneum contained a few scattered miliary tubercles. There was an increase of fibrous tissue in this organ, the knife in cutting it meeting with the characteristic resistance. The kidneys were contracted; the cortex narrowed; color yellowish-white, indicating chronic nephritis.

CASE 67.

F. B.; aged fifty-three years; nativity, West Indies; admitted to U. S. Marine Hospital, San Francisco, Cal., December 26, 1888; died January 31, 1889.

Necropsy (thirty hours after death).—The lungs were everywhere adherent to the chest wall and diaphragm from old inflammation. There was great increase of fibrous tissue in the lungs, making them firm and elastic to the touch. There were no characteristic miliary tubercles, but several cavities partly filled with purulent matter.

CASE 68.

P. T.; aged twenty-six years; nativity, Germany; admitted to U. S. Marine Hospital, San Francisco, Cal., November 28, 1888; died April 6, 1889.

Necropsy (about twenty-four hours after death).—Rigor appreciable; emaciation great; body exhaling a fetid odor. In left inguinal region was a fistulous opening through which emerged the end of a drainage tube. Scrofulous scars and swelling were seen about the neck and the cervical spine. Both lungs were firmly adherent to pleura. In the left pleura there was found a loculated collection of curdy matter about the middle of the outer surface of lung. The left lung was full of discrete tubercle, with a few nodular necrosed spits. The right lung was likewise full of tubercle, and fairly honeycombed with large and small cavities. The kidneys were both rather large and appreciably fatty, and in both were one or two white nodules, and one or two small cavities, evidently tubercular. From the inguinal region on the left side a roomy purulent sinus led up to the lumbar vertebræ, the three lower being more or less

considerably eaten away at the sides, and apparently full of foci of cheesy or creamy tubercular débris—fairly honeycombed, as it were. From the sides of these vertebrae a blind fistula led up to about the ninth or tenth dorsal vertebra.

CASE 69.

D. R.: aged twenty-four years; nativity, England; admitted to U. S. Marine Hospital, San Francisco, Cal., July 31, 1888; died January 18, 1889.

Necropsy (seven hours after death).—Body warm; no rigor; considerably emaciated. The left lung was firmly bound down by pleuritic adhesions over the normal situation of its upper half, into which space the lung had been crowded by a previous pleuritic effusion, of which only some 150 cubic centimeters were found in the great void left below the compressed lung. The latter was full of broken-down tuberculous nodules with a large cavity at the apex. Right lung had only one band of adhesion at apex. It was extremely congested, edematous, and full of scattered nodules of tubercle, but contained no cavities. Heart was somewhat fatty; there were some 50 cubic centimeters of pericardial fluid.

TUBERCLE OF INTESTINES.

CASE 1.

C. B. (colored); aged twenty-one; nativity, Georgia; admitted to the U. S. Marine Hospital, Portland, Me., October 15, 1888; died November 6, 1888.

History.—Had always been in average health, suffering only from diseases incident to childhood, but of late years had been ill with malarial fever, which yielded to treatment from time to time, only to recur. When admitted he was rather spare in flesh and scant of breath. His trouble was located in his abdomen, which for ten days previous had been bloated until the depression at the navel became a nodule, as seen in the last months of pregnancy. Considerable pain was present all the time, and a free peristalsis precluded the question of stoppage. Examination of affected portion revealed only excessive tympanitis with some tenderness on percussion. Other visceral organs gave normal physical signs. Temperature, 38.04°C. The diagnosis was obscure, but a tentative report of malarial remittent with typhoid complications was forwarded on the daily report and the case treated symptomatically. The patient was able to be up and about though weak, and he was soon confined to bed by my direction. His temperature ranged from 37.04 to 38.04 in the morning, and 38° to 40° in the evening, oftener nearer the maximum in both instances. The tympany was somewhat but not entirely relieved, and the patient began to improve, his temperature falling to normal in the morning for three days. On the eighteenth day he had persistent epistaxis which did not yield for several hours. It again reappeared the next day and the posterior nares had to be plugged to control it. The plugs were retained several days, and removed only to show a return of the hemorrhage. Great prostration followed, but the bleeding was kept at a minimum by styptics and other local measures. He died suddenly at 1 a. m. of the twenty-third day of treatment.

Necropsy.—The results of the examination of the several thoracic and abdominal viscera revealed nothing worthy of record, each organ being normal in appearance and texture, with the usual adhesions of the pleuræ, which seem to be an accompaniment of every *necropsy* in the recollection of the writer. The uniform infiltration of the mesenteric glands, which were enlarged to the size of a pea in some instances, showed his disease to have been *tabes mesenterica*, the diagnosis of which is so often obscured by the tympany and the complication of other intercurrent affections.

CASE 2.

O. C.; aged twenty-two years; nativity, Norway; admitted to U. S. Marine Hospital, San Francisco, Cal., August 6, 1888; died August 15, 1888.

History.—When admitted the following symptoms were present: Marked pallor of

the surface and mucous membranes; slight ulceration of the gums; and œdema of the face and ankles. There was some diarrhœa, but special attention was not called to this symptom until August 12, when it was found that during the preceding night there had been many movements of the bowels and the condition of the patient denoted the loss of considerable blood. The temperature after this time ranged from 38° to 39° C.

Necropsy.—The left lung appeared normal. The right lung was adhered to the chest wall over its central and upper portions anteriorly. Numerous red spots the size of millet seeds could be distinguished beneath the pleura over the greater part of this lung, and in the lung tissue under the adhered pleura there were numerous pigmentary deposits, these being far more numerous beneath the adhesions than in any other part of the lungs. The heart was somewhat hypertrophied, its weight being 450 grams. Its valves were normal. The spleen was much enlarged, weighing 830 grams. It was somewhat softened in consistence. The liver was enlarged, its left lobe extending 6 centimeters below the ensiform appendix. Its weight was 2,050 grams. There were a great number of ulcerations occupying the lower two-thirds of the small intestine. These had indurated bases raised above the surface and occupying the rugæ. The folds of the large intestine were thickened, their surfaces presenting superficial patches of a brown color, softened and in process of sloughing. The mesenteric glands were much enlarged. The kidneys were pale, but otherwise normal in appearance.

TUBERCLE OF MESENTERY.

J. M.; aged fifty years; nativity, Ireland; admitted to U. S. Marine Hospital, Cincinnati, Ohio, March 25, 1889; died June 7, 1889.

History.—Patient was first admitted to the hospital, February 2d, with diarrhœa; discharged recovered February 25. The diarrhœa returned within two or three weeks after leaving the hospital, and he was readmitted March 25. All remedies failed to control the trouble for more than a day at a time. Examination of his rectum revealed a small fissure on the posterior wall. He was anesthetized, and the sphincters stretched. Such a marked amelioration of the symptoms followed this for a few days it was hoped he was in a fair way to recover. The improvement, however, was only temporary; the diarrhœa returned, continued for a few days, and was followed by a constipation amounting at times to obstipation, sharp pains over the abdomen only slightly increased by pressure, and moderate tympanites. The ascending and descending colon became inflated with gas, and could be distinctly traced. Enlarged glands, or what appeared to be such, could be felt beneath the integument of the abdomen. Towards the last diarrhœa again became a prominent feature of the disease, though the patient declared his inability to evacuate the bowels except when lying on the back. The stomach towards the last rejected nourishment almost as soon as taken, milk being vomited in the shape of a thick formed curd. Emaciation now was very rapid. There was no rise of temperature at any time; the pulse was seldom more than 65, and often was as low as 56 (bradycardia). For two weeks before death the pain in the abdomen was so severe it was necessary to keep him almost constantly under the influence of morphia. He died of exhaustion the evening of June 7.

Necropsy (sixteen hours after death).—Body greatly emaciated; abdomen distended; hypostatic congestion posteriorly; moderate *rigor mortis*. Right lung firmly adherent to chest-wall; otherwise both lungs normal. Heart enveloped in a thick layer of fat, and muscular substance so soft and fatty that when laid on the table or held in the hand the organ spreads out into a flat mass in which it is difficult to see any resemblance to the normal heart. The right auricle is dilated. There is an aneurism of the pulmonary artery extending from its commencement at the right ventricle to almost its division into the right and left pulmonary arteries; its walls are very thin. The walls of the aorta are thin and atheromatous, and their caliber fully twice the normal. Weight of heart, 340 grams. The peritoneum and intestines are congested,

and the stomach and colon distended with gas. The descending colon is adherent to the peritoneum. The omentum appears thicker, and the grape-like aggregations of fat along the blood-vessels larger than normal. The liver is extremely fatty and soft, its substance being readily penetrated by the finger; weight, 1,770 grams. Spleen atrophied; weight, 120 grams. Left kidney enveloped in a mass of fat, and its medullary portion has undergone fatty degeneration; the pyramids of Malpighi are almost totally destroyed; weight, 310 grams. Right kidney appears about normal; weight, 190 grams.

PURPURA HEMORRHAGICA.

J. L.: aged twenty-six years; native of Norway; admitted to marine ward of St. Vincent's Hospital, at Norfolk, Va., March 2, 1889; died March 13, 1889.

History.—The patient had been on a vessel on the York River for several weeks loading lumber. He had been able to get fresh fruit, vegetables, etc., but probably contracted malaria and subsequently developed purpura. On admission he had a few hemorrhagic spots on arms and legs, complained of headache and weakness in his limbs. The hemorrhagic spots increased in number after uniting until a considerable extent of tissue would become involved. Blebs containing bloody serum formed at various points on the body, notably on the legs and feet and on the hands and points of the shoulder, buttocks, etc. The bowels moved at intervals of three or four times a day, the discharges being thin and dark colored. Patient complained of being hungry and would take beef tea, milk punches, etc., eagerly, but they did not satisfy his craving. He gradually grew weaker and finally died of exhaustion.

Necropsy (sixteen hours after death).—*Rigor mortis* well marked. Body fairly well nourished and covered with hemorrhagic spots and stains, and at various points, notably on hands, feet, and point of shoulders and thighs, were blebs containing bloody serum. Heart and lungs appeared normal except some hypostatic congestion on posterior portion of each lung. There were evidences of staining of the endocardium especially noticeable around the valves. The stomach gave evidence of submucous hemorrhages, and the mucous membrane was thickened and softened. The submucous hemorrhage was found to a greater or less extent throughout the small intestines, but was particularly marked at the commencement of the jejunum, where for nearly a meter in length the entire bowels seemed almost in a state of gangrene. There was no hemorrhage beneath the parietal peritoneum. The liver and kidneys were congested and had hemorrhagic spots scattered throughout their substance. (Hematuria had been present for several days before death, with hyaline and blood casts.) The spleen was enlarged, dark, soft, and pulpy. The brain was congested but no hemorrhage at any given point could be detected.

IDIOPATHIC (PERNICIOUS) ANÆMIA.

W. S., admitted to the marine ward of the "Sisters' Hospital," Buffalo, N. Y., November 30, 1888; died April 14, 1889.

History.—Patient was treated for rheumatism in the shoulder and arm of left side. He had a cachectic appearance from time of entering. At times he had hemorrhages from the rectum, from the nose, and toward the end of his illness from the stomach apparently, as no disease of the lung was noticeable, and the appearance of the blood seemed to warrant the belief that it came from the stomach. His appetite was pretty good, bowels fairly regular, urine normal, but the man's appearance was one of extreme anæmia. He complained of no pain, until a week prior to his death when pain was elicited by pressure upon the epigastrium. He never vomited food and died from asthenia.

Necropsy.—Thorax opened and organs inspected in situ. Heart found flabby, some fatty degeneration being present; the valves, with the exception of slight hardness of edges, were normal. Lungs healthy. Abdominal cavity opened. Liver somewhat enlarged. The pyloric orifice of the stomach was found to be constricted. Mucous membrane of the stomach very anæmic looking. No ulcers found. Spleen normal in size and consistency. Kidneys found perfectly healthy.

INFLAMMATION OF THE CEREBRAL MEMBRANES.

CASE 1.

J. T.; aged twenty-seven years; nativity, Canada; admitted to the marine ward, Sisters' Hospital, Buffalo, N. Y., August 18, 1888; died August 25, 1888.

History.—His condition on arrival was one of extreme prostration, surface cold, feeble pulse and pupils dilated; he was conscious and answered questions in rational manner. Temperature 37° . He was soon lying down in the bed sobbing half aloud; would not answer questions. Occiput was very hot while rest of the body comparatively cool; temperature now was 38.5° , pulse 88; put on ice bag to occiput and cervical region, which seemed to relieve him; about noon he was better and would answer questions in monosyllables; he seemed to be very melancholic. Took some nourishment; passed urine involuntarily; bowels moved once in bed, passage had yellow color and simulated enteric fever stools; no eruption. In evening became very violent and had to be restrained; this delirium was more or less constant till his death on the 25th. At no time did his temperature exceed 39.5° ; no history of this case could be obtained as he was removed from his vessel at midnight, nor was the patient able to give an account of himself after admission. A *post-mortem* could not be obtained. His relatives state that at one time in his life he was crazy, and had always had a violent temper. His convulsive movements were kept up till an hour before his death, when he became comatose, his breathing stertorous, and his pulse very feeble.

CASE 2.

J. H.; aged forty-five years; nativity, United States; was admitted to the marine ward, Sisters' Hospital, Buffalo, N. Y., December 5, 1888, and died December 23, 1888.

History.—When admitted complained of rheumatism in right shoulder; he gradually recovered under treatment. In the middle of the second week he had a slight attack of intermittent fever, which lasted three days; after that he appeared drowsy, having to be aroused to eat his meals. He complained a good deal of headache at this time, and a few days later deafness, sore throat, and huskiness of voice were noticed; these symptoms became intensified, and about the 21st swallowing became difficult. Careful examination of the throat revealed no abnormal condition. There was slight delirium at times; face had livid appearance, pulse slow and rather strong, temperature normal, respiration full enough but labored. Slight opisthotonus on last day. Patient died in coma on the 23d.

Necropsy (twelve hours after death).—Brain removed; meninges were considerably congested and very adherent; ventricles filled with serum; brain substance appeared healthy, as was also the case with the cerebellum; lungs slightly congested; heart normal. No other organs examined.

CASE 3.

Syphilis.

G. V. L.; aged twenty-three years; nativity, Belgium; a patient of the Imperial German consul; was admitted to U. S. Marine Hospital at Wilmington, N. C., May 25, suffering from intermittent fever, tertian in type.

History.—States that he had syphilis two months ago, for which he received no treatment. The initial fever, sore throat, and secondary eruption were present, and his body is now covered with a fading syphilitic macula. He can not speak English, and it is difficult to obtain a definite history of his case. The intermittent yielded readily to treatment, and on the 28th he was apparently convalescent. On the morning of the 29th he complained of drowsiness, the temperature was normal, the appetite indifferent, and he was not suffering in any way. He remained in this condition

throughout the day, and during the evening round presented nothing abnormal. At 12.30 a. m. I was called by the night nurse, who stated that the patient had awakened screaming and immediately went into a convulsion. The convulsion had passed off when I reached him, but he was very restless, would not answer questions, and manifested an uncontrollable desire to tear the skin of his face, hips, and lower limbs. At 3 a. m., on the 30th, he had another attack similar to the first, his screams being shrill and loud. This attack, like its predecessor, was but momentary in character and he lapsed into his former condition. The temperature was taken during both seizures and found normal. The pulse during the attacks was very rapid, sometimes weak and irregular, the respiration hurried and sobbing. During the day he was very restless, and the desire to tear his skin was so great that he could be restrained with difficulty. When his hands and limbs were tied he turned over on his face and rubbed the latter against the pillow and mattress, tearing the skin from it, so that it was raw and bleeding. During the day he passed his urine and feces in the bed and his bowels were slightly loose. The urine is abundant and contains a small amount of albumen. The bromides and antisyphilitic remedies were given from the first attack, and as evening approached his restless condition was so marked and he could be restrained with so much difficulty that morphia was given hypodermatically. Calomel and quinine in good doses were given during the day, alternating with the bromides. He continued much in the same condition during the night and the following day, and early on the morning of June 2 he was again seized with convulsions. They were clonic in character and involved the muscles of the neck, trunk, and extremities, but not those of the face. The temperature now rose, the only elevation noted since the first convulsion, and marked $39\frac{1}{2}^{\circ}$ C. The pulse was rapid, weak, and irregular, alternated with periods in which it was slower and more regular. The respirations were rapid and shallow, and there was the same insane desire to tear the skin from the face and limbs. During the day the temperature rose to $40\frac{1}{2}^{\circ}$ C., and under the influence of antipyretics fell to 38° C. The convulsive tendency lessened towards the evening and the temperature did not again exceed 39° C. The pulse rate at one time was 160 beats per minute, and it gradually fell to 120, remaining at that rate. During the day some nourishment was administered by the mouth and all medication was by hypodermatic method. On the morning of the 3d his condition was improved, the temperature registering $37\frac{2}{3}^{\circ}$ C., the pulse 110, and he recognized those about him. He spoke for the first time since the seizure on the night of the 30th, expressed himself as feeling better, took nourishment freely, and the improvement was looked upon as encouraging. During the day the temperature again rose and a busy, noisy delirium set in, which, with intervals of somnolence, lasted until evening and ended in coma at 9 p. m.

Necropsy (twelve hours after death).—*Rigor mortis* well marked; face denuded of skin on the right side; body stained with a macular eruption. On removal of calvarium noted fullness of the vessels of the dura, extensive inflammation of the pia and arachnoid, covering the convexity and sides of the cerebrum with effusion of lymph, most marked in the region of the fissures of Rolando were noted. The cerebral cortex was softened beneath the inflamed membranes. On section *puncta vasculosa* were numerous; the lateral ventricles contained considerable effusion; the choroid plexes were congested, and the structures forming the floor of the ventricle (*corpus striatum*, *thalamus opticus*, and *fornix*) were softened. The pons and medulla showed softening, and on section numerous punctiform extravasations were noted throughout their substance. The floor of the fourth ventricle was marked by several points of extravasation, most noted near the origin of the seventh and eighth pairs of cranial nerves. The kidneys were slightly congested, most marked in the left. The other organs were healthy. The liver was remarkably small. Weight of viscera: Brain, 1,299 grams; heart, 271 grams; right lung, 411 grams; left lung, 476 grams; liver, 1,243 grams; right kidney, 145 grams; left, 131 grams; spleen, 230 grams.

CASE 4.

H. L.; aged thirty years; nativity, unknown; admitted to marine ward of St. Luke's Hospital, New Bedford, Mass., March 13, 1889; died, March 13, 1889.

History.—The patient was apparently well until three days before admission, when he had a chill, followed by fever and delirium of a maniacal sort. No history of anything could be gained from the captain. His wild delirium continued up to about 9 o'clock in the evening, when he died. It was evident that he had meningitis from the rapid and irregular pulse and the uncontrollable delirium, with opisthotonic movements.

Necropsy (twelve hours after death).—Brain only of interest. On removing the dura mater the most beautiful specimen of meningitis of the convexity which I have ever seen made its appearance. No process could be found at the base. The pus extended over the upper and outer parts of the hemispheres only. The basal dura looked absolutely free from disease, but by stripping it away and chiseling into the petrous portion of the temporal bone on each side, I found suppurative trouble in the left internal ear of old date. There was no inflammation of the dura over the base and no disturbance of vessels. The bone looked quite as well before chiseling as the other side. No abscess or focus of suppuration existed in any part of the brain.

MYELITIS.

T. K.; aged thirty-four years; a native of Ireland; admitted to the U. S. Marine Hospital at Baltimore, Md., February 5, 1889; died, February 24, 1889.

History.—On admission patient complained of insomnia and profuse diarrhæa. The patella reflex and ankle clonus were exaggerated. There was anorexia and prostration. Patient grew rapidly worse, and death ensued on the 24th instant.

Necropsy (ten hours after death).—*Rigor mortis* was well marked. The nutrition was fair, but he was prematurely old, as his hair and beard were gray. There were several small, circular scars, and two or three large bullæ on the legs. A small bed-sore was found over the sacrum; the skin was jaundiced; the brain was œdematous. The spinal cord, beginning on a level with the seventh dorsal vertebra and extending to the lower extremity, presented evidence of an acute inflammation, such as extreme softening and numerous hemorrhages into the gray matter, but chiefly in the anterior horn. The heart was normal, except the endocardium, which, in connection with the lining membrane of the blood-vessels, was stained a deep red. The left lung, both at the base and apex, was bound down by old adhesions. Several scars and two small cavities were found at the apex of the same lung. Throughout both lungs, but especially at the base, were numerous infarctions, triangular in shape, soft in the center, and surrounded by an area of hyperæmia. The liver was large, soft, and very much congested. The spleen was twice its normal size, very dark, friable, and studded with milary abscesses. The kidneys were enlarged, soft, congested, contained many small abscesses, and lines of pus could be traced from the cortices to the pelves, which were inflamed. Both ureters were dilated and inflamed, but the right was more so than the left. An abscess occupied the whole interior of the right supra-renal capsule. On opening the bladder a small quantity of pus, blood, and urine escaped, while the walls were thickened and covered with shreds of mucous membrane and inflammatory débris. The prostate gland was the seat of a chronic inflammation and slight enlargement. A slight stricture and chronic urethritis were found in the deep portions of the urethra.

ABSCESS OF THE BRAIN.

G. D.; aged seventeen years; nativity, Scotland; admitted to U. S. Marine Hospital, San Francisco, Cal., April 24, 1888; died July 7, 1888.

History.—When admitted he was unconscious. The right side of the face and neck was discolored and swollen, resulting from a fall into the hold of a vessel. Bleeding

occurred from the ears, nose, and mouth. The breathing was stertorous. The left pupil did not respond to light.

Necropsy.—The body was much emaciated. The skull was found to be extremely thin. There was an unusual quantity of fluid in the arachnoid space. The veins on the surface of the brain were distended; the lateral sinus on the right side contained firm clots and pus, and was apparently impervious to the passage of blood. The petrous portion of the temporal bone was movable at the suture joining it with the occipital, the separation extending into the groove for the lateral sinus. The white matter of the middle lobe of the cerebrum contained two communicating abscesses, outside and above the optic thalamus; one the size of a walnut with well-marked walls, the other extending downwards and ill defined. The primary lesion was doubtless an injury to the lateral sinus, causing hemorrhage into the brain substance, and finally resulting in the formation of abscesses. The internal jugular vein contained pus in its upper portion and a firm, organized clot about 6 centimeters in length fastened to the walls of the vessel and terminating at a point opposite the cricoid cartilage. From this point a clot of more recent formation extended down the vein into the right side of the heart, with a branch extending some distance in the subclavian vein. The clot in the right side of the heart occupied both the auricle and ventricle, being fastened to the muscoli pectinati in the latter cavity.

SCLEROSIS OF SPINAL CORD.

J. T.; aged forty-two years; nativity, Virginia; admitted to U. S. Marine Hospital, Cincinnati, Ohio, January 12, 1887, with progressive muscular atrophy, and glosso-labio-pharyngeal paralysis; discharged improved August 9, 1887. Re-admitted April 21, 1888; died December 18, 1888.

History.—Upon admission both upper extremities were wasted, the right being more affected, the head of which humerus stood out very prominently, as did also the bony eminences and tendons of the hands; the flexor tendons were contracted, giving to the hands the characteristic claw-like appearance, or *main en griffe*. The muscles of the thorax, abdomen, and lower extremities were wasted, though to a less extent than those of the arms. The tongue was enlarged. Early in September there was œdema of both upper and lower extremities, rapidly followed by general anasarca.

Necropsy (fifteen hours after death).—*Rigor mortis* well marked. General anasarca. Four large cicatrices on dorsal surface of penis: phimosis; penis and scrotum œdematous. Blood fluid, flows freely as incision is made through parietes of thorax and abdomen. Muscles forming the walls of these cavities wasted to mere shreds and infiltrated with fat. Pericardium filled with fluid. Heart hypertrophied and enormously dilated; its muscular tissue is soft; valves thickened; weight 465 grams. Both lungs adherent to chest walls; about half normal size, and a little darker in color than normal; crepitate in all parts. Right kidney weighs 150 grams; capsule adherent; left, 180 grams. Liver on section presents the typical nutmeg appearance; weight, 1,380 grams. There is a cyst in upper and posterior portion of right lobe containing 60 cubic centimeters of a straw-colored fluid. Brain congested and a little soft; otherwise apparently normal. Cord unusually small and quite soft. Weight of brain, 1,440 grams.

APOPLEXY.

CASE 1.

V. W.; aged twenty-nine years; native of Portugal; admitted to U. S. Marine Hospital at Boston, Mass., December 22, 1888; died December 25, 1888.

Four days previous to admission he was dashed by a wave against the cabin and rendered unconscious, in which condition he remained until death.

Necropsy.—*Rigor mortis* well marked; some emaciation; brain weighed 1,380 grams; dura mater very adherent to base of skull; clots were found in the lateral ventricles

and a small abscess in the corpus callosum. Hypostatic congestion of both lungs; right lung weighed 760 grams; left lung, 720 grams. Heart enlarged; weight, 300 grams. Slight atheromatous degeneration of the aorta. Liver congested, and weighed 1,630 grams.

CASE 2.

S. D.; aged fifty years; native of New Brunswick; was admitted to the U. S. Marine Hospital at Boston, Mass., July 11, 1888; died August 14.

History.—On admission patient was suffering with syphilitic periostitis of the tibia and violent headache. The headache subsided, and the leg improved under the use of potassium iodide, but the apathy which had been noticed in the beginning increased, with incontinence of urine and feces. Two days before death tonic convulsions set in, affecting the eyes and both upper and lower extremities, and continued till death. During dissolution a dark liquid like coffee grounds was vomited.

Necropsy (twelve hours after death).—*Rigor mortis* well marked; body thin; dark spots like ecchymoses on nose, ears, hands, and back. Brain weighed 1,390 grams; dura mater much congested and adherent in a few places from meningitis. Small organized clot was found in the left lateral sinus. Brain substance soft and easily torn; on section puncta vasculosa large and numerous; velum interpositum thickened and congested. Sections through the pons varolii revealed patches of hemorrhagic effusion throughout its substance. Stomach normal.

CASE 3.

Middle meningeal artery.

A. A.; aged twenty-eight years; nativity, Norway; admitted to the U. S. Marine Hospital, Portland, Me., September 20, 1888, and died same day, five minutes after admission.

History.—Had been a patient at the hospital some weeks prior for treatment of a venereal lesion (primary), and was discharged recovered. For some days prior to admission he had been upon a prolonged and continuous "spree," during which time he had fallen down a flight of stairs, the day before admission. Having been put to bed that night by the boarding master he retired to sleep in an alcoholic coma and never aroused therefrom. When he failed to put in an appearance in the morning they went to his room and found him insensible. A local physician was called who pronounced it a case of "double pneumonia" (!) resulting from intoxication and exposure, and our ambulance was requested. Upon arrival at the hospital the tentative diagnosis of compression of the brain was made, but hardly had the hasty examination been made when he gradually expired.

Necropsy (twenty-one hours after death).—Body well nourished and developed. No external evidence of injury except an abrasion on the forearm. *Rigor mortis* well marked, with hypostatic congestion of capillaries. Calvarium removed and found to be not more than one-sixteenth of an inch in thickness in some places. Dura slightly adherent to skull, and about 80 cubic centimeters of clotted blood found between it and the parietes on the right side occupying the whole parietal region. Brain substance, ventricles, and vessels healthy, except the middle meningeal artery, which was ruptured. Pleura adherent to diaphragm and chest walls on both sides. Lungs somewhat congested. Heart weighed 340.20 grams, the right ventricle containing *ante-mortem* clot, non-adherent, 7.62 centimeters long, size of little finger, extending into pulmonary artery. No pathological changes about the valves or great vessels. Liver weighed 2,069.55 grams, firm in texture, but considerably congested. Spleen weighed 226.80 grams, engorged with dark blood. Kidneys weighed 155.92 grams each, and showed no degenerative change, and nothing unusual was found in the intestinal tract. The cause of death, as shown by the necropsy, was rupture of the middle meningeal artery and compression of the brain, resulting from the hemorrhage.

CASE 4.

M. M.; aged forty years; nativity, Scotland; admitted to U. S. Marine Hospital, San Francisco, Cal., September 3, 1888; died September 4, 1888.

History.—This patient was unconscious from the time of his admission until death. He was reported to have fallen into the hold of a vessel five days before coming to the hospital. No further history could be obtained.

Necropsy.—When the membranes of the brain were incised some bloody fluid escaped. The dura mater was adhered to the skull extensively on the left side. All the membranes were thickened and opaque. The vessels on the surface of the brain were distended with blood. A clot of considerable size was found adhered to the surface of the temporo-sphenoidal lobe. The brain tissue underneath this was softened from pressure. An opening partly cicatrized was found in the membranes over the middle meningeal artery and opposite the clot.

HEMIPLEGIA.

CASE 1.

T. C.; aged forty-nine years; born in Massachusetts; admitted to the U. S. Marine Hospital, Chicago, Ill., July 23, 1888; died July 27, 1888.

History.—The patient was brought into the hospital in a semi-comatose condition, and was found to be paralyzed on the left side. No account could be obtained as to when he was paralyzed, as he was transferred from the Alexis Brothers' Hospital, and the authorities there said that he had been picked up on the street and brought to their hospital. The patient was treated in this hospital last winter for mitral regurgitation, and when discharged he was in very poor condition, having enlarged veins of both legs. When admitted, the pupils were slightly dilated. There was no facial paralysis or deviation of the tongue. Had incontinence of urine, and involuntary evacuation of feces. The heart was found to be very much hypertrophied, and a mitral regurgitation could be easily heard. The patient could not swallow liquid or solid food, and was fed twice a day by means of the stomach tube. The respirations were of the peculiar Cheyne-Stokes variety. The respirations became very laborious, and often it would be five minutes between respirations. When the respirations stopped the heart would gradually stop beating, and then after a few seconds it would commence again. He died in one of these paroxysms.

Necropsy (six hours after death).—The calvarium removed and the brain examined. The vessels of the dura mater were very much congested. The right hemisphere was found to be very much softened in the convolution of the corpus callosum. The middle cerebral artery was found to be occluded on the right side. There had been a slight hemorrhage into the lateral ventricle on the right side, and the clot was partly broken down. There was slight effusion into the third ventricle. The corpus striatum on the right side was very much softened. The brain substance was generally soft throughout, and the convolutions could not be traced. The lungs were normal. The heart was very much enlarged, and contained one large *ante-mortem* clot in the right auricle, and one large *post-mortem* clot in the left ventricle. The mitral valve was almost entirely destroyed. Spleen very much contracted and adherent to the peritoneum. Both kidneys slightly congested. All the other organs normal.

CASE 2.

C. S. N.; aged fifty-four years; nativity, New Jersey; was admitted to the U. S. Marine Hospital, New York, on the 31st of May, 1889.

History.—On admission he complained of slight dizziness and a feeling of fatigue. On the day after admission he noticed some impairment in his ability to use his hands. The loss of power increased slowly until there was almost complete paralysis on the left side, associated with some diminution of sensation. On the right side

motion was slightly impaired; sensation normal. There was a slight diminution of the tendon reflexes. Under treatment the motor power gradually improved, but he continued to be subject to attacks of somnolency. On June 29 he began to get rapidly worse, and died at 10 a. m. June 30.

Necropsy (twenty-six hours after death).—Body of a white male, fairly well nourished; *rigor mortis* marked, livores on posterior surface of body. Upon removing the calvarium the membranes covering the brain presented evidences of a recent meningitis; they were considerably thickened in places, and of darker color than normal. The arterioles throughout the brain substance contained well organized clots. This was especially the case upon the right side. There was a spot of softening about the size of an almond in the area supplied by the right middle meningeal artery. There was also some softening in the neighborhood of the corpus striatum, and of the nates. Thoracic cavity: Left lung weighed 800 grams. The lower lobe was hypostatically congested. Right lung, weight 910 grams. The lower lobe was hypostatically congested. Heart, weight 330 grams. The arch of the aorta was atheromatous, and covered with innumerable plaques, especially at the superior portion of the arch. All the valves were normal. Liver was adhered to the diaphragm, and fatty; it weighed 1,940 grams. Spleen, weight 170 grams; was normal, except for slight increase in the number of trabeculae. Right kidney, weight 170 grams; normal. Left kidney, weight 170 grams; normal. All the other organs were normal.

CASE 3.

J. E. A.; aged sixty-five years; nativity, New York; was admitted to the U. S. Marine Hospital, New York.

History.—General health good. Had corea when a boy. Four years ago he noticed that his right leg was getting weak and the weakness subsequently extended to his right arm. Could walk with a cane until April last. On admission he had entirely lost the use of his right leg. Has headache. There is evidence of an old depressed fracture of the skull, just posterior to the vertex. The paralysis of the right arm gradually grew worse, and he became despondent and almost hysterical. On the 18th of June he lost control of his sphincters. He continued in about the same condition and died on December 18, 1888.

Necropsy (seventeen hours after death).—*Rigor mortis* marked. Thorax and abdomen opened by median line incision. Strong adhesions of right and left pleura to lungs. Hypostatic congestion of lower lobes. Patches of pneumonitis. Lungs pigmented on surface. Heart, hypertrophy of left side. Aorta atheromatous in ascending part of arch. One of semilunar valves atheromatous. Livers lightly cirrhotic. Right kidney, numerous infarctions. Left kidney, cirrhotic. Skull opened; dura mater adherent and thickened; brain removed, considerable deposit of lymph in arachnoid spaces. On section cortical substance sclerosed; on further sections through white matter and through ventricles there was found a large area at junction of white and gray matter of left hemisphere of cerebrum occupied by an apoplectic cyst. This had evidently been the site of softening, causing the first attack of paralysis, occurring three years ago. On both sides the areas supplied by the vessels traversing the fissure of Sylvius were softened and broken down. To the right of the decussation of the pons varolii there was a small spot that was softened and extravasated with blood. All vessels of brain were atheromatous. Other organs not examined.

CASE 4.

C. K.; aged thirty-five years; native of Germany; was admitted to the Marine Hospital, Port Townsend, Wash., June 21, 1888, with rheumatism of gonorrhœal origin, being accompanied with a slight internal discharge. Treatment for a time afforded temporary relief, when an endocarditis supervened, apparently of a suppurative character. His temperature ranged between 37° C. and 39.4° C. with typhoid

symptoms which usually attend this condition. The treatment was supportive and directed to maintain an alkaline and soluble condition of the blood. At 7 a. m. of July 24, a complete hemiplegia of the right side suddenly occurred, after sitting up for a stool. Aphasia was complete, although patient appeared to be conscious. The condition appeared to be due to an embolism of the left cerebral artery; deglutition somewhat difficult; constipation; urine of high color and withdrawn by catheter; prognosis unfavorable; and death occurred August 2, 1888.

Necropsy (fifteen hours after death).—Body fairly nourished and *rigor mortis* marked; calvarium adherent to membranes upon left side, but no meningitis present. Weight of brain, 1,310 grams; convolutions well defined. Gradual and parallel planes of incision showed left brain to be softer than right, and containing an acute spot of degeneration the size of a walnut, and further search revealed an embolism of the middle cerebral artery. Lungs normal, with some hypostatic congestion upon the right side. Heart somewhat enlarged, and the endocardium showed evidence of inflammation of no very recent origin. The mitral valves were almost completely destroyed, one leaf having a perforation 0.70 centimeter in diameter, forming a so-called valvular aneurism, from which an *ante mortem* clot was withdrawn. The embolism had evidently started from this point. Liver large but normal. The spleen weighed 450 grams, and contained yellowish spots of discoloration, of an embolic or syphilitic origin. Left kidney larger than right, but healthy; bladder empty.

CASE 5.

E. P.; aged fifty-five years; nativity, England; admitted to U. S. Marine Hospital, Chicago, Ill., December 7, 1888; died December 20, 1888.

History.—No knowledge of his history previous to being brought in on a stretcher. Condition on admission showed long illness. Complete hemiplegia of left side of body was evident. He could not speak intelligibly; passed urine and feces involuntarily. He had a slight cough, with little sputum. He took very little nourishment. Strychnia administered by the mouth, and the galvanic current applied to the spine, had no influence. Whisky and carbonate of ammonia were given toward the close.

Necropsy (twenty hours after death).—*Rigor mortis* marked. Brain showed congestion of meningeal vessels; lateral ventricles entirely filled with serum. Lungs oedematous, with softened caseous patches at apices. Heart normal; pericardium contained 50 cubic centimeters of clear serum. Liver much congested and enlarged, approaching nutmeg type. Spleen large, dark, congested. Kidneys granular. Intestines and stomach normal. Bladder empty.

PERICARDITIS—PLEURISY WITH EFFUSION.

W. D. (colored): aged twenty-four years; nativity, Missouri; admitted to the U. S. Marine Hospital, St. Louis, Mo., May 25, 1889; died May 26.

History.—Patient said he had been sick about three weeks before entering the hospital, complaining of pain in the chest, shortness of breath, dry persistent cough, and sense of oppression and palpitation about the heart. Heart's impulse could not be seen, and scarcely felt; there was slight prominence of the præcordial region, increased area of cardiac dullness, and the sounds were feebly heard. Death occurred suddenly, without premonition.

Necropsy (eleven hours after death).—Slight *rigor mortis*. Some præcordial prominence. Plenritic adhesions on both sides, of recent appearance. Lungs both congested. Pericardium much distended with straw-colored fluid, and showed signs of recent inflammation.

VALVULAR DISEASE OF THE HEART.

CASE 1.

Aortic—Cirrhosis of liver.

R. B.; aged thirty-two years; nativity, Maine; was admitted to hospital treatment at Galveston, Tex., on December 4, 1888, with diagnosis of aortic obstruction, and was discharged December 10, 1888, improved. On December 24, 1888, he was again admitted with same diagnosis.

History.—When first examined, on December 4, there was a large collection of fluid in the abdominal cavity, so much so that the conditions of the organs could not be determined. There was a loud systolic murmur over the aortic valves, with marked hypertrophy of the heart. The sounds at the mitral valve were muffled by a pericardial effusion. A secondary pneumonia was developed in lower lobe of right lung; also an acute congestion of kidneys, with hæmaturia. Said he had inflammatory rheumatism several years ago. Died January 15, 1889.

Necropsy (thirteen hours after death).—General anasarca; skin of thighs and legs inflamed from tension. Large scars on both legs. Heart: Pericardium contained about 65 cubic centimeters of serous fluid. Walls of left side of heart much hypertrophied; no dilatation of its cavities. One cusp of aortic valves very much thickened; another presented a new growth resembling a wart; results of an old inflammation. Mitral valves were also thickened. Abdominal cavity filled with serous fluid. Spleen about five times normal size. Tissue firmer than it should be. Liver cirrhotic. Its surface presented a nodular appearance. Tissue creaked on being cut with knife; capsule very much thickened. Microscopical examination showed cirrhosis of the gland.

CASE 2.

Aortic.

W. C.; aged twenty-two years; nativity, Missonri; admitted to the U. S. Marine Hospital, New Orleans, La., July 18, 1888; died July 20, 1888.

History.—When admitted, patient was suffering from intermittent fever, in conjunction with valvular disease of the heart. Fever yielded readily to sulphate of quinine. General condition bad, emaciated, and weak; anorexia, insomnia, and occasionally slight delirium. Auscultation over space occupied by heart and posteriorly over aortic valves revealed only one sound, the first. Citrate of caffeine acted nicely for about thirty-six hours, strengthening heart impulse and giving second sound, though indistinctly; later heart flagged again, and strychnia hypodermically, with ammonia and whisky by mouth, did some good and probably kept heart up to its work for forty-eight hours longer. No dyspnœa, no cough. Temperature 38° for two days, normal for one day, and then sub-normal for two days previous to death. Pulse 85 per minute at first; later, 60 to 65. Artery easily compressed.

Necropsy (eighteen hours after death).—Body of medium size, slightly built; emaciated. *Rigor mortis* present. Putrefactive change beginning. Both pleuræ adherent throughout most of their extent from old pleuritic adhesions. No fluid in pleural cavity. Lungs cedematous; slight patch of hypostatic pneumonia in post-inferior portion. Heart small, contracted, and pale. Aortic valves thickened from old inflammatory trouble, and on which a recent endocardial inflammation was grafted; valves being acutely inflamed in places, and discolored, as was the artery for an inch or more of its internal surface, having the peculiar pinkish hue observed in such cases. Liver, kidneys, and spleen congested. Organs all more or less discolored from *post-mortem* changes. Brain not examined.

CASE 3.

Aortic.

R. R. (colored); aged thirty-six years; a native of Illinois; admitted to the U. S. Marine Hospital, Memphis, Tenn., October 3, 1888.

History.—He had been treated for heart trouble several months before his admission. His greatest difficulty was to get a proper amount of sleep; he said he felt as if his lungs were full whenever he tried to sleep; urgent dyspnoea; paroxysmal cough; poor appetite; swelling of feet; slight movable pain in his chest; there was a loud systolic and a diastolic murmur over aortic orifice; apex lower than normal and to the left of the mamillary line. Bromide of potash and syrup of the iodide of iron gave much relief; stimulants not borne at all; his decline constant and gradual; unable to take any solid food, as it increased his dyspnoea; small quantities of milk, soup, and broths well borne.

Necropsy.—*Rigor mortis* very slight; fluid in all serous cavities, except left pleural cavity, which had been obliterated by a former plenisy. In right pleural cavity was 1,490 cubic centimeters of fluid, in pericardium 250 cubic centimeters, in abdomen 200; lungs normal; heart enlarged, especially the left side; left ventricle much thicker than normal; aorta, about $2\frac{1}{2}$ centimeters from origin, was 10 centimeters in circumference, internal measurement; the aortic valves were adherent at their free borders and inefficient; the mitral orifice admitted four fingers easily, so did the tricuspid orifice; in the right side was a large *ante-mortem* clot; the kidneys were small; the cortical substance normal in amount, the pyramidal tissue much diminished. Liver normal; heart weight, 630 grams; liver, 1,492; right lung, 590; left, 524; right kidney, 150; left, 180.

CASE 4.

Aortic.

T. G.; aged sixty-three years; nativity, Holland; admitted to U. S. Marine Hospital, San Francisco, Cal., November 5, 1888; died January 31, 1889.

Necropsy (eight hours after death).—Slight general anasarca; some *rigor mortis*; body well nourished. In the right pleura were some 1,500 cubic centimeters clear serum, and in the left about 400 cubic centimeters. No adhesions. Lungs healthy. The pericardial sac was greatly enlarged, and contained, relaxed rather than distended, some 350 cubic centimeters serum and an enormous heart. The latter was decidedly hypertrophied, but dilated as well. The hypertrophy was confined to the ventricular walls, and, while all four cavities were dilated, there was no auricular hypertrophy. The valves were all diseased. All were thinned and stretched to compensate for dilated orifices, except the aortic. These were markedly insufficient, thickened, atheromatous, and to the middle of posterior segment was attached a fibrinous vegetation about the volume of a pea. The mitral valve could not be demonstrated insufficient, though the segments were thinned. The pulmonary was perforated as if by a small shot in one segment. All its segments appeared redundant, plicated, and, when stretched, extremely thin. The tricuspid valve was altogether insufficient. Both the aorta and the pulmonary artery were dilated. Liver was some one and one-half times normal size, considerably congested, giving firm, granular, somewhat nutmeg section. Spleen nearly the size and shape of normal right lobe of liver—purple on section. Kidneys both too large, and deeply congested. The cortices of both were friable and rather pale yellowish in hue, no doubt fatty. There were three deep cicatrices on the greater curvature of the right kidney, as though the sites of former peripheral cysts.

CASE 5.

Aortic and mitral.—Cirrhosis of liver.

T. H.; aged sixty-one years; nativity, Ireland; admitted to the U. S. Marine Hospital, San Francisco, Cal., October 15, 1888; died October 17, 1888.

Necropsy (twenty-four hours after death).—The pleural cavities each contained about 750 cubic centimeters of straw-colored fluid. The larger bronchi contained some frothy mucus. A part of each lung was collapsed apparently from the pressure caused by the presence of the fluid in the pleural. The heart was dilated, its walls being of less than normal thickness. The cavities of the right side contained a large *ante mortem* clot, which sent a prolongation into the pulmonary artery. The latter part of the clot seemed of firmer consistence than that in the ventricle. The aortic valves were thickened and insufficient. The walls of the aorta were thick and hard, the inner surface being studded with calcareous matter. The beginning of this vessel was dilated. The mitral was thickened and insufficient for closing the mitral orifice. The liver was smaller than normal, and presented the typical nutmeg appearance. Its capsule was adherent and the liver tissue cut with difficulty. The spleen was about half its normal size and very hard in consistence. The kidneys were slightly swollen.

CASE 6.

Aortic and mitral.

G. W. C.; aged fifty-two years; nativity, Massachusetts; admitted to marine ward, German Hospital, Philadelphia, Pa., November 10, 1888; died November 30, 1888.

History.—Auscultation revealed both mitral and aortic murmurs, the latter being the more pronounced. The area of cardiac dullness was much greater than normal and pulsation was visible over a large space. The pulse at the wrist was feeble, and the arteries, generally, were atheromatous. There was also œdema of both feet. On the right leg was an indolent-varicose ulcer. His temperature was continuously sub-normal, and the right leg was cold. Pulsation was moderately full in the popliteal space of this leg, but could be barely detected at the ankles, in which locality, after November 26, there was none. The toes were cold, but extremely sensitive, and vesicles formed on the dorsum of the foot. These varied symptoms were interpreted as indicating gangrene from arterial embolism. Hot fomentations locally; stimulants and concentrated fluid nourishment, with digitalis in full doses, were the basis of treatment. He sank rapidly and died at 1.30 p. m., November 30, 1888.

Necropsy (forty-five hours after death).—Body emaciated. Both lungs rather firmly adherent to thoracic wall, with hypostatic congestion of lower lobes. Pericardium contained 230 cubic centimeters of serum. There was considerable hypertrophy of left ventricle, and extreme dilation of right ventricle and auricle. Weight 600 grams. The aortic valves contained atheromatous plates and from their insufficiency permitted free regurgitation. Mitral valve also was insufficient. The aorta was dilated and atheromatous. Liver was cirrhotic—weight 2,200 grams. Kidneys fatty and contracted, each weighed 110 grams.

CASE 7.

Aortic and mitral.

J. W.; aged forty-nine years; nativity, Ohio; admitted to U. S. Marine Hospital, Louisville, Ky., March 9, 1889; died May 4, 1889.

History.—When admitted, patient had anasarca of the lower extremities, with shortness of breath, which was increased by effort. Heart murmurs were very perceptible. Patient was treated with digitalis and iron, diuretic and cathartic, but with no benefit.

Necropsy (twenty hours after death).—Body of a well-nourished male, colored. *Rigor mortis* almost absent. On opening the thorax, the pleural cavities were found to contain a large amount of effusion, the lungs being much diminished in capacity. Both lungs, on section, were found to be congested and compressed, the left one more than the right. The left lung exhibited an abnormality in shape of a short sulcus dividing the lower lobe into two. The heart was much enlarged and its cavities dilated; the walls being of about normal thickness. The posterior flap of the mitral valve was thickened and shrunken, causing incompetence of the valve. The tricuspid valve was also incompetent. In the walls of the aorta, just above the semilunar valves, were found large, thickened patches of arteritis without calcareous deposits. The liver was small and cirrhotic. The kidneys were congested.

CASE 8.

Aortic and mitral.

W. G. (colored); aged fifty years; a native of Tennessee; was admitted to the U. S. Marine Hospital, Memphis, Tenn., June 27, 1888.

History.—He had previously been treated as an office patient and in the hospital. Urgent dyspnea, cough, anasarca, poor appetite, and great weakness. There was a loud systolic murmur over both aortic and mitral valves. Patient unable to lie down for a month before he died. Died August 26, 1888.

Necropsy.—General anasarca. Fluid in all serous cavities. Three liters in abdominal cavity, one liter in each pleural cavity, and one-half liter in pericardium. Heart enlarged. Mitral orifice admits three fingers and tricuspid four fingers. There was stenosis of aortic and inefficiency of mitral valves.

CASE 9.

J. B.; aged fifty-nine years; born in Pennsylvania; was admitted to the U. S. Marine Hospital, port of New York, February 20, 1888, and died October 8, 1888.

History.—On being admitted he complained of pain in his back and neck, associated with cough and dyspnea. Examination of his chest showed an aortic direct murmur, the mitral and tricuspid valves being normal. The lungs appeared normal. During the time he was in the hospital, digitalis and other remedies were administered, but without much benefit; he died October 8, 1888.

Necropsy (fifty hours after death).—Body of a greatly emaciated adult negro. In right pleural cavity about 300 cubic centimeters of clear serum was found. Right lung, weight 444 grams, normal. Left pleural cavity contained about 500 cubic centimeters of clear serum. Left lung, weight 255 grams. Tubercular masses in upper lobe, external border. Heart weighed 265 grams; muscular wall of right ventricle thin. Tricuspid valve normal. Pulmonary semilunar very large, but not patent. Left ventricle hypertrophied, stenosis of mitral valve, which was thickened about its free border. Aortic semilunar valves enormously hypertrophied, but are intact by water-pressure test. Aorta double natural size, atheromatous, even smaller branches so diseased. Spleen weighs 131 grams; soft in consistence. Liver weighs 1,220 grams; normal. Right kidney 115 grams; large cyst on free border; vessels atheromatous. Left kidney, lobulated; weighs 140 grams; slightly cirrhotic. Bladder wall greatly thickened. Intestines, stomach, and pancreas normal. Brain not examined.

CASE 10.

Aortic and mitral.

A. T. (colored); aged thirty-eight years; nativity, Virginia; admitted to marine ward, St. Vincent Hospital, Norfolk, Va., October 30, 1888, died November 17, 1888.

Necropsy.—Body well nourished; oedema of feet and legs. *Rigor mortis* poorly marked. Lungs normal in appearance, except slight congestion. Heart: The

left ventricle was dilated and hypertrophied; the left auricle was slightly dilated. Right side of heart dilated. The mitral valve was almost entirely bound down on one side. The chordæ tendinæ were thickened. At a point about 4 centimeters below, and anterior to the aortic opening, was found a cavity within the breast walls about 4 centimeters in its longitudinal axis, and about 3 centimeters in its shortest axis, which contained an old organized clot that was lying loose in the cavity. The cavity did not communicate either with the cavity of the heart or external to it. It was a closed cavity, and had the appearance of having been at one time an abscess. It was only discovered by being cut when the heart was laid open. Evidences of an old endocarditis were present. The rest of the viscera were normal.

This case had had several attacks of heart failure, but responded to heart stimulants. He died suddenly one morning after making some slight muscular movement, such as rising from a chair. During life the diagnosis had been dilatation, with hypertrophy; mitral insufficiency and aortic stenosis.

CASE 11.

Aortic and mitral.

W. S.; aged twenty-four years; nativity, England; admitted to U. S. Marine Hospital, Detroit, Mich., February 4, 1889; died, April 10, 1889.

History.—He was emaciated, pale, and anæmic on admission, and complained much of dyspnoea; there were signs of dilatation of right side of heart, and murmurs were heard at apex and base. He stated that he had never had rheumatism nor syphilis, but the records of the hospital show that he was under treatment from September 13 to September 30, 1887, for ulcer of penis; and from November 19, 1886, to January 12, 1887, for pericarditis. Anasarca developed gradually toward the end.

Necropsy (twelve hours after death).—*Rigor mortis* marked. General dropsy. Heart enlarged, cavities dilated, especially of right side. Walls of left ventricle much hypertrophied. Mitral and aortic valves the seat of calcareous degeneration; most marked at mitral. Considerable clotted blood in left ventricle. Pericardium adherent, sac obliterated. Kidneys and spleen congested. Other organs apparently normal.

CASE 12.

Aortic, tricuspid, and mitral—Aortic aneurysm.

W. D.; aged thirty-seven years; nativity, England; admitted to U. S. Marine Hospital, Detroit, Mich., October 27, 1888; died November 21, 1888.

History.—He gave a history of several attacks of rheumatic fever, one three years ago being very severe. When admitted he was suffering from dyspnoea, œdema of lower extremities, precordial pain, apprehension of fatal issue, irregular action of heart, with murmur heard at apex and base of heart and over the ensiform. Later on there was pain over lower lobe of right lung, gradual increase in severity of above symptoms with delirium during the last week.

Necropsy (seven hours after death).—*Rigor mortis* well marked. Abdomen and lower extremities much swollen. Pericardium adherent to heart throughout. Heart enlarged, weight 1,020 grams; cavities dilated and walls hypertrophied. Chordæ tendinæ of both ventricles enlarged. *Ante-mortem* clot in left ventricle; calcareous deposit on pulmonary semilunar valves; aorta much enlarged. Aortic, mitral, and tricuspid valves found incompetent on testing with water. Left lung normal, weight 480 grams; right lung much congested, weight 725 grams, and some solidification in posterior portion of lower lobe, probably hypostatic. Abdominal enlargement found to be from gas in stomach, intestines, and peritoneal cavity. Calvarium opened; small lymph deposits found along margins of longitudinal fissure of cerebrum with considerable effusion into ventricles and congestion of pia mater; weight of brain 1,450 grams.

CASE 13.

Mitral.

P. H.; aged twenty-four years; nativity, New York; admitted to U. S. Marine Hospital, Stapleton, N. Y., October 2, 1888; died November 9, 1888.

Necropsy (forty-eight hours after death).—Extensive adhesion of pericardium to heart on anterior surface; heart much enlarged and flabby; mitral valves greatly thickened; warty vegetations along edges; other valves normal. Lungs, adhesions of left pleura; hypostatic congestion of lower lobes of both lungs. Liver, fatty; spleen, enlarged; right kidney, slightly enlarged, congested and fatty; left kidney, same; pus in abdominal cavity; adhesions of peritoneum to spleen and to portions of gut; no evidence of perforation of gut.

CASE 14.

Mitral.

E. B.; aged forty-five years; native of Prince Edward Island; was admitted to the U. S. Marine Hospital at Chelsea, Mass., November 21, 1888; died April 8, 1889.

History.—On admission patient was suffering with dyspnea and congestion of lungs, and as soon as the râles subsided sufficiently to allow satisfactory examination of the heart, a murmur was heard with each sound of the heart. He rallied from this attack, but compensation soon failed and general dropsy resulted, soon ending in death.

Necropsy (six hours after death).—*Rigor mortis* not well established; hypostatic congestion of neck, face, and back; general dropsy. Pleural cavities each contained about 2,000 cubic centimeters of fluid; the pericardium and peritoneal cavity each contained about 500 cubic centimeters of fluid. The heart weighed 940 grams, and was enormously hypertrophied; cavities not much dilated, but filled with clots, some of which were *ante-mortem*. The aortic valves were insufficient, and were covered with calcified plates that could be stripped off with forceps. The first portion of the aorta was lined with similar plates. The mitral valves were also insufficient, one segment having been partially destroyed. Right lung weighed 620 grams; the lowest lobe contained two areas of hepatization, circular in shape, and about 3 centimeters in diameter. Pleura not adherent. Left lung weighed 750 grams; numerous old pleuritic adhesions; inferior lobe contained one area of hepatization about 6 centimeters in diameter. Liver weighed 1,440 grams; normal. Right kidney weighed 260 grams; left, 240 grams; both slightly congested, otherwise normal.

CASE 15.

Mitral.

W. B.; aged thirty-two years; native of England; was admitted to the U. S. Marine Hospital at Chelsea, Mass., April 11, 1889; died April 17.

History.—Patient had been under treatment in hospital some months before, suffering with the same disease, namely, mitral insufficiency and hypertrophy, but had improved, and was discharged. On re-admission it was evident that compensation had failed; there was general dropsy and dyspnea, and death soon closed the scene.

Necropsy.—No *rigor mortis*; body well nourished; legs and feet œdematous. Pleural and pericardial cavities contained about 1,000 cubic centimeters and 250 cubic centimeters of serous effusion, respectively. Lungs were compressed; right weighed 520 grams, left weighed 480 grams; slightly congested, otherwise normal. Heart weighed 720 grams; moderately hypertrophied but greatly dilated, especially the left ventricle, the walls of which were thin and flabby. One segment of mitral valve eroded, producing insufficiency. Liver, normal; weight, 1,450 grams. Right kidney weighed 300 grams; left weighed 280 grams. Spleen weighed 350 grams.

CASE 16.

Mitral.

T. W.; aged sixty-six years; nativity, Sweden; admitted to the U. S. Marine Hospital, St. Louis, Mo., November 21, 1885; died May 24, 1889.

History.—Had rheumatic fever when fifteen years old; gonorrhœa several years since; otherwise health was always good until a week prior to admission. Had an attack of vertigo without loss of consciousness, after exposure to inclement weather, followed by difficulty in speech and dysphagia. When admitted patient could not stand alone, yet showed no symptoms of paralysis. From cardiac murmurs heard, a diagnosis of mitral and aortic heart disease was made. Subsequent to admission to hospital right side anesthesia became apparent, followed by ulceration of skin of the legs. The symptoms were inconstant and of varying degree until a few days before death, when a comatose condition ensued and continued until the end.

Necropsy (twenty-five hours after death).—Body rather obese. An extensive gangrenous ulcer on left leg, a smaller one on the right. Slight pleuritic adhesions on both sides. Both lungs engorged with blood. Pericardium covered with fat. Heart enlarged and fatty; left auricle greatly hypertrophied, being greater in capacity than the left ventricle; the latter seemed to be smaller than is usual; mitral valve-cusps adherent to each other at their free borders so completely as to create wonder as to how any blood could have passed into the ventricle. At the seat of adhesion between the valve-cusps was a calcareous body about the size of a large cherry seed firmly fixed in the tissues. The right side of the heart and the great vessels were normal. Examination of the brain and other organs was impracticable, owing to unavoidable existing circumstances.

CASE 17.

Mitral.

E. P.; aged twenty-nine years; nativity, Norway; admitted to U. S. Marine Hospital, Chicago, Ill., August 20, 1888; died September 14, 1888.

Necropsy.—*Rigor mortis* marked. Body well nourished. Chest: Both lungs much congested; pericardium contained about 100 cubic centimeters serum; heart greatly hypertrophied, weighing 720 grams; mitral and aortic valves entirely missing, the ulcerated edges that remained indicating where they had been attached. Coronary veins were greatly dilated. Left heart contained about 50 cubic centimeters, of thickened, tarry blood.

CASE 18.

Mitral.

J. D.; aged forty years; born in Michigan; admitted to the U. S. Marine Hospital, Chicago, Ill., June 26, 1888; died July 18, 1888.

History.—When admitted he stated that he had good health until two months ago, when he contracted a severe cold. At that time he had a cough, fever (temperature 38.4°), and a severe pain over the precordial region. At the time of admission the patient complained of great trouble in breathing, palpitation of the heart, inability to sleep, and loss of appetite. His legs were œdematous, and his abdomen was distended by fluid. On percussion the base of both lungs was flat. Heart very much hypertrophied. Blowing sound over aortic semilunar valves and mitral regurgitation.

Necropsy (six hours after death).—Right pleura contained 500 cubic centimeters of serum. Upper lobe of right lung contained two tubercular deposits the size of walnuts. Both lungs slightly congested. The pericardium contained about 50 cubic centimeters of serum. The heart was very much enlarged, the left ventricle in par-

ticular. The aorta was distended into a fusiform aneurism at the arch. The mitral valve was partly destroyed by adhesive inflammation, and one leaflet had adherent inflammatory deposits on it, which prevented it from closing. The other valves were normal. The liver was very much enlarged. Spleen normal; kidneys congested.

FATTY DEGENERATION OF HEART.

CASE 1.

T. D.; aged sixty years; native of Ireland; was admitted to the U. S. Marine Hospital, Port Townsend, Wash., August 29, 1888; died December 15, 1888, with fatty degeneration of the heart, and hypertrophy with dilatation of this organ.

History.—The patient's embonpoint was good; color of skin bad, and the "arcus senilis" present, the usual accompaniment of fatty degeneration. Patient had noticed œdema about his ankles for some time, accompanied with difficulty of breathing. Under the infusion of digitalis, Bastham's mixture, etc., his condition became quite comfortable for a time, when œdema of the penis, scrotum, and lower extremities set in. This condition yielded to hydragogue cathartics and heart tonics, but recurred later until death occurred December 15, 1888.

Necropsy (eighteen hours after death).—œdema marked; scrotum large, thickened, and slightly ruptured at small points of puncture to relieve pressure. Heart enlarged and fatty; left ventricle dilated, as also the first portion of the aorta, which was sacculated, and its lining membrane filled with calcareous deposits, having the feel of a nutmeg grater, and the prospect of an aneurism or of emboli arising from this surface, had life been prolonged. Liver, spleen, and kidneys were in a fair working condition.

CASE 2.

Fatty degeneration of liver and kidneys—Organic stricture of urethra.

A. R.; aged forty-seven years; nativity, New York; admitted to U. S. Marine Hospital, San Francisco, Cal., November 20, 1888; died November 24, 1888.

Necropsy (sixteen hours after death).—*Rigor* present. Body muscular and well nourished. Face and neck livid. Extensive ecchymotic congestion of dependent surfaces of body and limbs. Thorax: Lungs were both intensely congested; airless in dependent portions; œdematous elsewhere. In right lung, at posterior lower portion of upper lobe, was a pneumonic consolidation of the size of a goose's egg. Over outer side and lower outer borders of both lungs were pleuritic adhesions, rather firm. Heart was covered with fat, and the coronary vessels appeared fatty. On section the muscular tissue did not appear much degenerated. It was, however, paler than normal, much too friable, and under the microscope fatty granules could be seen in the sheath of the muscular fibers. In both sides of the heart firm fibrinous clots were attached to the walls of the cavities, and were continuous through the auriculo-ventricular orifices into the lumen of the aorta and pulmonary artery, in the latter reaching beyond its bifurcation. These clots were not large, but rather firm, elastic, and ribbon-like, and must have formed long before death. Liver was somewhat enlarged, congested, of a pale yellowish hue on scraped section. The microscope showed most extensive fatty degeneration of cells. The organ was extremely friable. Kidneys were somewhat enlarged, and capsule was readily detached, in spite of a few cicatricial depressions on their greater curvature. Section of both gave unmistakable picture of far-gone fatty degeneration. Scrapings from the cut section showed under microscope a mass of oil globules and granules, granular nuclei, and granular epithelia. The right kidney was more fatty than the left. Neither was noticeably congested. Brain: The calvarium being removed there appeared evidence of congestion of membranes and serous effusion between them. The brain was not further examined. Bladder was contracted, containing only some 20 cubic centime-

ers of purulent urine. The pus evidently originated from a chronic inflammation, for the lining membrane of bladder was opaque, congested in spots, and on either side of the trigonium was a deep pouch separated by a prominent ridge of hypertrophied muscular tissue. A No. 14 E. sound could be passed into the bladder with sensible, but not undue, exercise of force.

NOTE.—This sailor was treated here for a stricture of the urethra about two years ago. Urethrotomy was performed. When discharged, in January, 1887, he was advised to continue the use of sounds regularly for several months, but he failed to follow the advice. He was re-admitted November 24, 1888; upon examination a stricture was found in the membranous portion of the urethra, which was moderately firm. A No. 8 sound, English scale, was passed without difficulty, and the stricture was dilated to No. 14 E. Although the operation of passing the larger sized sounds gave considerable pain, the patient did not appear to suffer excessively. Four hours after the operation a severe *rigor* supervened, which lasted about an hour, followed by mild delirium with occasional vomiting. Had several chills during night. After this the temperature never reached the normal point; the patient gradually failed, and succumbed on the fourth day.

CASE 3.

Fatty degeneration of liver and kidneys.

A. E. R.; aged fifty-two; nativity, Connecticut; admitted to U. S. Marine Hospital, San Francisco, Cal., January 22, 1889; died March 3, 1889.

Necropsy (six hours after death).—No *rigor*. Some emaciation; face rather dusky and livid. Left pleura contained no fluid; at the apex of lung was a firm old pleuritic adhesion. The lung was intensely congested in dependent portions, and œdematous throughout. At the apex it was puckered and contracted where it had been adherent to pleura. Right pleura contained some 700 cubic centimeters of somewhat flaky serum, collected at the base of the lung. The latter was lifted, compressed, and everywhere else more or less firmly bound down to thoracic walls by pleuritic adhesions. The effusion was thus encysted or loculated at its base, and the pleura lining the cavity much thickened. The lower lobes of this lung, as stated, were compressed and somewhat leathery to the feel. They were likewise intensely congested, and the whole organ was very œdematous. The heart was rather flabby, lined with fat, its muscle fatty and somewhat friable. The kidneys were congested, but on section showed fatty degeneration of the parenchyma. The liver was of normal size; a dirty yellow color, and quite friable, the capsule easily removed, tearing off with it the underlying fatty tissue. On section it was bloodless, dirty yellow, oily looking. The spleen was very dark-purple, twice its natural size, in consistence a mere pulp.

CASE 4.

Rheumatic fever—Pleurisy—Multiple uterine fibroids.

S. C. (negress); aged forty-eight years; nativity, Louisiana; admitted to marine ward, Mercy Hospital, Pittsburgh, Pa., June 14, 1889; died June 17, 1889.

History.—Was treated at the office several months ago for rheumatism. Patient was delirious at time of admission, and no history was obtained. Left ankle was swollen and tender; abdomen distended with gas, and examination by palpation revealed the presence of a multiple tumor of the uterus. The heart was very weak, but the sounds were normal otherwise. There was retention of urine, due to pressure on the neck of the bladder, and the urine contained albumen in considerable amount. Under the use of sodii salicylas and stimulants she rallied and regained consciousness on the 16th, when she stated she had been sick with acute rheumatism four weeks. Pleurisy developed in the evening, and extended rapidly; delirium returned, and death took place at 6 p. m. on the 17th.

Necropsy (sixteen hours after death).—Rigor mortis moderate. Body of a large negro, with much adipose tissue. Left ankle and foot swollen. Lungs normal, but there were extensive recent pleuritic adhesions on the left side, and a few on right side. Heart large, flabby, and fatty, and full of fluid blood; its tissue soft, and easily torn. Liver adherent to diaphragm; normal in size, but very soft. The kidneys were acutely congested; the intestines distended with gas, but not diseased. The uterus contained nine distinct fibroids, two of which had undergone calcareous degeneration. The largest tumor was 6 inches in diameter.

CASE 5.

Rheumatic fever—Pleurisy—Inflammation of liver—Fatty kidneys.

G. W. B.; aged twenty-eight years; nativity, Maryland; admitted to U. S. Marine Hospital, Portland, Me., May 29, 1889; died June 25, 1889.

History.—Has had malarial fever, and has been a "moderate" drinker. He complained of pain and tenderness in nearly every joint, and knees, ankles, and one wrist were swollen. Hot dressings were applied, and sodium salicylate, iodide of potash, quinine, and opiates were administered. Result, relief of rheumatic symptoms. He then suffered from pleuritic pains on the right side, with pain and tenderness over the region of the liver, for which emollient applications were applied with benefit.

Necropsy (eight hours after death).—Rigor mortis moderate. Body well nourished. Chest: Some recent adhesions of right pleura; about 200 cubic centimeters serum in cavity. Some hypostatic congestion of lungs. The pericardium contained about 150 cubic centimeters straw-colored fluid. Heart fatty and enlarged; weight, 400 grams. Both ventricles contained firm, fibrinous clots, more or less entangled in the chordae tendinae, prolongation of which extended far into the great vessels, tapering off into soft clots. The valves appeared to be normal. Liver much enlarged and congested; weight, 3,210 grams. Its surface was somewhat mottled. There were about 300 cubic centimeters serum in the abdominal cavity. Kidneys extremely fatty; weight, 450 grams each. Capsule easily removed. Spleen: Weight, 400 grams; dark, and of a grumous, pulpy consistency.

DILATATION OF LEFT SIDE OF HEART.

H. T. H.; aged forty-two years; native of Maine; admitted to U. S. Marine Hospital, Port Townsend, Wash., at 4 p. m., November 29, 1888; died at 9.20 p. m.

No history could be obtained from or about the patient, except that he had been upon a prolonged spree.

*Necropsy (sixteen hours after death).—*Body fairly nourished. Heart showed some signs of fatty degeneration; the left ventricle was considerably dilated and walls of the aorta thinned out, with a prospective aneurism in the near future. Liver larger than normal and of a nutmeg appearance.

DILATATION OF RIGHT HEART.

W. H.; aged fifty-three years; nativity, Maryland; admitted to marine ward of St. Vincent's Hospital, Norfolk, Va., March 5, 1889; died May 13, 1889.

History.—This man had been suffering from heart disease for a number of years previous to admission. The compensation had been about exhausted when he presented himself. He suffered greatly from dyspnoea, which was increased by the slightest exertion. His appetite was fair. He could only sleep in the sitting posture. He was placed on strophanthus and Tr. ferri chloridi, under which treatment he improved. He was able to sleep reclining and with the aid of opium. Stimulants and nourishing diet helped to keep his strength up, but it was only a question of time when the heart would fail. He had several attacks of syncope, but rallied from each

by aid of stimulants. About a week before his death occlusion of the right femoral artery occurred, due probably to an embolus from the heart lodging at the point of origin of the profunda artery. The limb became cold and pulseless, turned dark in spots, and became abraded over a considerable extent. Patient gradually grew weaker and finally died of heart failure.

Necropsy.—Body well nourished. *Rigor mortis* slight. Lungs were congested. Heart: right auricle was dilated; left heart was hypertrophied; walls of left ventricle were much thickened; mitral valve insufficient. Patches of atheroma were found about the arch of the aorta. Stomach and intestines were normal. Liver congested and undergoing fatty degeneration. Spleen normal. Left kidney rather small. Right kidney nodular and irregular. Capsule stripped readily. Markings distinct. Right femoral artery contained a clot from the origin of the profunda nearly up to Poupart's ligament. The right thigh and leg were blue and œdematous and the skin had been rubbed off. All other organs were normal.

ANEURYSM.

CASE 1.

Arch of the aorta.

J. F. C. ; aged sixty years ; native of Maine ; admitted to U. S. Marine Hospital at Boston, Mass., June 14, 1888 ; died November 26.

History.—Patient stated that he had been sick about a year, being first affected with pain through the left breast and shoulder to the back. Later on had two slight hemorrhages from the lungs, with cough, anorexia, nausea, unpleasant sensations after eating, and some loss of flesh. The general aspect was unhealthy, suggesting carcinoma. The left lung gave slight evidence of disease, the respiratory murmur being weak and lung not filling well. Nothing abnormal could be detected about the heart. The patient did not improve under treatment, but complained almost constantly of the pain in left side and back, requiring opiates for its relief ; more or less cough, and occasionally slight hæmorrhages from the lungs. The heart and lungs were examined frequently, but nothing noticeable was observed about the heart, and the patient was thought to be suffering from some form of phthisis, probably fibroid. About two months before death the patient had a violent attack of spasmodic asthma, and later on another, both of which were relieved by hypodermic injections of morphia ; but the third attack produced death from apnœa.

Necropsy.—No *rigor mortis*. Slight emaciation. A reducible oblique inguinal hernia of the omentum was observed on the right side. Left lung weighed 170 grams ; was much atrophied ; pleural cavity entirely obliterated ; lung substance intensely congested, but no tubercular deposit. Right lung weighed 250 grams ; less congested and less adherent than left. Heart weighed 310 grams ; valves normal ; the sinuses of Valsalva around the aortic opening were thickly incrustated with calcareous nodules, but this did not prevent accurate closure of the valves. The aorta was found dilated to double its normal size from its origin to transverse portion of the arch, where it suddenly dilated, forming a large fusiform aneurysm which extended from this point to the lower border of the seventh dorsal vertebra, including the left sides of the bodies of five vertebræ with the heads and necks of the corresponding ribs. The posterior wall of the sac was absent, the bone being exposed from the third to the seventh vertebra inclusive. The bodies were all more or less eroded and the heads and necks of the fourth and fifth ribs and part of the intervertebral disks corresponding were absorbed, but the medullary cavity was not opened. The walls of the sac were quite thick and firm ; at three or more places were deposits of organized fibrin in laminæ, the largest being about 4 to 2 centimeters ; at other points were large plaques of calcareous deposits. The edges of the sac were firmly adherent around the vertebræ and there was no rupture. Capacity about 500 cubic centimeters, nearly filled with loose *ante-mortem* clots. Specimen preserved.

CASE 2.

Arch of the aorta.

J. MeV.; aged fifty-five years; nativity, New York; admitted to the U. S. Marine Hospital, New Orleans, La., January 19, 1888; died September 24, 1888.

Necropsy (eight hours after death).—Body was large, strongly built, and in good condition. There were scars in mastoid and pectoral region from episplasties. Thoracic cavity: On opening the chest the heart was found to be hypertrophied, dilated, and displaced to the left. The aortic valves were damaged considerably. There was a sacculated aneurism beginning at arch of aorta and extending into the innominate artery. The aneurism consisted of two sacs, one 8 centimeters in diameter in the arch and the other 6 centimeters in diameter in the innominate. The aortic sac was filled with fibrinous layers, and its presence over the œsophagus had caused erosion and ulceration of that organ. Several of the dorsal vertebræ were also eroded and necrosed. The innominate sac had very thin walls, but they remained intact. Death was caused by hæmorrhage resulting from rupture of the walls of sac where it pressed on the œsophagus. Lungs contained several calcareous masses in their apices, and both of them were œdematous. The liver was large (weight $4\frac{3}{4}$ kilograms) and presented lesions usually found in amyloid organs. The spleen was large, and somewhat resembled a "sago" spleen. The kidneys were large and pale; weight of right kidney, 246 grams; weight of left kidney, 217 grams. Capsules were easily separated. Cortical and medullary line was indistinct. Other organs were found normal.

CASE 3.

L. L.; aged thirty-nine years; born in Norway; was admitted to the U. S. Marine Hospital, port of New York, October 16, 1888, and died October 20, 1888.

History.—On being admitted he complained of cough and dyspnœa; physical examination showed the area of heart slightly increased and displaced towards the left, with an area on the right side of sternum where a double murmur could be heard. Patient became worse and complained of extreme dyspnœa and difficulty in swallowing; had diarrhœa for two days before death.

Necropsy (sixteen hours after death).—*Rigor mortis* marked. Right lung adherent to the upper and middle lobes by fibrinous bands. Lung tissue normal, 585 grams; left lung normal, 498 grams. Heart enormously enlarged; apex almost in axillary line; circumscribed thickening of the pericardium; the arch of the aorta was greatly dilated and was the seat of a chronic aortitis. No fibrinous deposits. Aortic valves thickened. The aneurysmal sac had made pressure on the trachea, flattening it out against the bodies of the vertebra. Other organs normal except the spleen. Chronic splenitis.

CASE 4.

Arch of the aorta—Rheumatism.

C. S.; aged forty-four years; nativity, United States; admitted to the marine ward of the Sisters' Hospital, Buffalo, N. Y., May 21, 1889; died May 29, 1889.

History.—When admitted the patient stated that he had been for about two weeks previous engaged in fitting out his vessel, and that he slept during this time in the hold of the vessel which was very damp and cold. Upon admittance he complained of indefinite rheumatic pains, referable directly to exposure, but at no time was attention directed either subjectively or objectively to any chest trouble, nor was cough at any time complained of. The patient was so nearly recovered that he was to be discharged from the hospital on the day that he died. At about 2.30 a. m. of that morning—eight days after admission—he awoke with an attack of hæmoptysis and died within five minutes.

Necropsy.—The examination of the head and abdomen revealed nothing abnormal

except a few plates of atheroma in the aortic coats. In the chest was found a small sacculated aneurysm of the aorta, in the ascending portion of the arch, of the size of a walnut, and scattered along the surface of the internal coat of the artery were numerous patches of atheromatous degenerations. The aneurysm proper had perforated the lung and had ruptured the tubes, being filled with semi-coagulated blood. No evidence of any recent pneumonitis. *Rigor mortis* not marked.

CASE 5.

Aneurysm of aorta—Bright's disease—Tubercle of lung.

H. C.; aged fifty-two years; nativity, Connecticut; admitted to U. S. Marine Hospital, New York, December 7, 1888; died March 16, 1889.

History.—On admission a diagnosis was made of Bright's disease, with a subsequent complication of tubercle of lung. The patient was poorly nourished and was afflicted with considerable dyspnoea. He had moderate cough and expectoration. Examination of his urine revealed albuminuria. He gave a history of pneumonia four years previously, from which his ill-health dated. His strength diminished progressively until the date of his death, when he was extremely emaciated and weak. On March 16, 1889, as he was about to eat dinner, he was seized with hemorrhage, the blood gushing in a stream from his mouth; death was immediate.

Neeropsy (five hours after death).—Body of a white male adult. The usual incision was made from the suprasternal notch to the symphysis pubis. On opening the pleural cavity of the left side old adhesions of great density were found, and almost the entire cavity was filled with serous exudation and fibrinous deposit. The left lung was in a state of atelectasis, and was crowded backward and upward against the posterior chest wall. The lung weighed 680 grams, and in its lower lobe contained yellow tubercle, both disseminated and in nodules. The whole organ was impermeable to air. There were old plenritic adhesions on the right side, but no effusion into the pleural cavity. The lung tissue was hyperæmic and œdematous, and filled with bloody frothy effusion, but otherwise healthy. The pericardium contained about 75 cubic centimeters of clear amber-colored fluid. The heart tissue was normal in appearance, the organ of natural size, and the valves competent. Arising from the ascending portion of the arch of the aorta was an aneurysm of about the size of a hen's egg, the dilatation commencing quite close to the heart. The sac contained 55 grams of old decolorized, laminated fibrin. The sack had extended to the left, dissecting up the tissues about the trachea and exposing the tracheal rings, and producing erosion of the cartilages and adjacent structures. It had produced ulceration through the trachea at the bifurcation of the latter, but the opening thus produced had been closed by clotted fibrin and the pressure of the surrounding tissues. The final bursting had taken place into the left bronchus about one inch below its origin and through its posterior wall. The liver weighed 1,450 grams. On section the central portion of the hepatic cells showed dark red and hyperæmic, with peripheral fatty degeneration, presenting the appearance described as "nutmeg liver." The kidneys presented well marked parenchymatous nephritis. The spleen was small, slate-gray color externally, and dark red on section.

CASE 6.

Arch of the aorta—Vesicular emphysema.

E. C. K.; aged forty-two years; nativity, America; admitted to the marine ward of the Cleveland City Hospital, Cleveland, Ohio, May 26, 1888; died July 2, 1888.

History.—During the past eight months this case had been occasionally under observation, and upon one occasion he had been admitted to the hospital. When he first presented himself he complained of symptoms which closely resembled those of asthma. He suffered with spasmodic asthmatic attacks, and otherwise the physical

signs were negative. After a short course of treatment he invariably got better, and expressed himself as feeling quite well again. After a time, however, he as invariably returned, suffering with his old symptoms. The periods of immunity became constantly shorter, the recurring attacks more severe, and each time requiring a longer course of treatment to obtain relief. Upon his admission, on May 26, he was much worse than ever before. The dyspnoea, which formerly had only come on in paroxysms and could be thoroughly relieved, was now much more stubborn, and complete relief could not be obtained. A constant wheezing sound emanated from the chest, and upon auscultation the respiratory murmur was faint, almost inaudible at times, but dry bronchial râles were heard, and also a stridulous sound, which was apparently traceable to a narrowing of the trachea. There was no bruit or abnormal sound originating in the heart or blood vessels that could be discovered on examination of the chest, either anteriorly or posteriorly. The pulse was the same at both wrists, and the chest presented no portions of abnormal dullness on percussion. The subjective symptoms were difficulty of breathing and pain, sometimes under the sternum and sometimes shooting up into one or both shoulders or around the chest, and at times was very severe. The dyspnoea was extremely distressing and almost constant, simply varying in degree, and finally the patient spent his entire time in his chair, with his head inclined forward. There was also a troublesome cough, and the voice at times cracked, and was of uncertain tone. He died from asphyxia and exhaustion incident to the distressing dyspnoea.

Necropsy (eight hours after death).—Body well nourished, cyanotic, and here and there dark purple spots. Thorax and abdomen opened. The lungs were expanded, and did not collapse when the chest was opened, and gave evidence of being affected with vesicular emphysema. The heart was enlarged to half again its normal size. The transverse portion of the arch of the aorta was the seat of an aneurysm. In length the aneurysm occupied all of the transverse aorta, and involved a small portion of the descending aorta; its greatest diameter was 5 centimeters. The walls of the aneurysm were quite thick, being lined with layers of fibrin, well organized. There had apparently been no danger of rupturing. The tumor was thoroughly adherent to the surrounding parts, and pressed firmly against the trachea. The body of the third vertebra was deeply eroded. The aneurysm contained an *ante mortem* clot, little branches from which extended into the innominate, left carotid, and subclavian arteries. The other thoracic and the abdominal viscera apparently normal.

CASE 7.

Thoracic aorta.

J. O. D.; aged twenty-nine years; admitted to the U. S. Marine Hospital, Baltimore, Md., October 1, 1888; died October 17, 1888.

Necropsy.—The arch of the aorta was slightly atheromatous. Two aneurysms were found projecting from the abdominal aorta. The larger aneurysm was about the size of a fetal head, sacculated; contained a semi organized clot adherent to the neighboring structures, projecting forward from near the origin of the cœliac axis, and presented a circular opening, through which blood had escaped and filled the abdominal cavity. The smaller aneurysm was about the size of a walnut and situated immediately below the former. The liver was slightly granular.

CASE 8.

Thoracic aorta.

A. C. H.; aged fifty-four years; native of Ireland; was admitted to the U. S. Marine Hospital at Port Townsend, Wash., June 7, 1889; died June 29, 1889.

History.—At this time the patient was emaciated and restless, temperature 40° C. in the evening. He stated that he had been sick for about a week. Tongue dry,

with some sordes; no special pain about side or spinal column; and no dyspnœa; and although a medium-sized aneurysm of the thoracic aorta was recognized, it did not appear to be of sufficient size to account for his typhoid condition. Several days before death he threw up a small quantity of blood, apparently from the lung, also at 2 a. m. of the 29th a considerably larger quantity. At this time it was evident that the aneurysmal sac had opened into the lung. The radial pulse was fairly full and regular, and the condition of collapse not prominent, showing the hemorrhage to be slow. Moist râles were abundant over both lungs, and dyspnœa considerable for the first time. The heart valves were competent.

Necropsy (ten hours after death).—A fusiform aneurysm of the thoracic aorta, external to the pericardial sac, was found, which had ruptured into the lung. Its walls were rough throughout with calcareous deposits, and the left sides of the second to the fourth dorsal vertebræ were considerably eroded, but the spinal cord was not exposed.

CASE 9.

Abdominal aorta.

D. L.; aged thirty-nine years; nativity, Greece; admitted to U. S. Marine Hospital, San Francisco, Cal., March 5, 1889; died April 2, 1889.

Necropsy.—Upon opening the thorax the left pleural cavity was found filled with fluid and coagulated blood; most of the latter was of recent formation; while a part was firm and old. The lung on this side was adhered to the chest wall in several places, and presented the appearance of miliary tubercles at its apex. The diaphragm was perforated on the left side of the median line, the perforation being necessarily of large size to permit the passage of clots. The right lung presented small tubercular nodules at its apex. In the examination of the abdomen an aneurysm was found in the course of the aorta, just above the cœliac axis. The sac protruded in front of the vessel to a slight degree, its greater portion occupying the posterior aspect covering the bodies of the vertebræ and extending some distance on either side. The anterior surfaces of the bodies of the last dorsal and first and second lumbar vertebræ were deeply eroded from one side to the other.

PASSIVE CONGESTION OF THE LUNGS.

J. J.; aged thirty-five years; native of Sweden; admitted to U. S. Marine Hospital at Boston, Mass., October 22, 1888; died October 23.

History.—Patient was brought in ambulance but was able to walk to his room; was pale, weak, chilly, surface cool, pulse feeble; stated that he had been suffering with chills and fever before admission. Quinine was administered freely by mouth, and hypodermically, also stimulants externally and internally, but the patient died about 4 in the morning with the symptoms of congestive chill.

Necropsy (seven hours after death).—*Rigor mortis* well established; body well nourished; hypostatic congestion of all dependent parts of the body. All the viscera in a highly congested condition. Heart weighed 430 grams; nothing abnormal noted. Left lung weighed 630 grams; no adhesions. Right lung weighed 710 grams; universally adherent; both congested. Liver weighed 2,500 grams; very dark in color and quite friable. Spleen weighed 890 grams; dark purple color and extremely friable. Left kidney weighed 190 grams, right 195 grams; both congested but otherwise normal. Urine remaining in bladder was tested: Specific gravity 1,012; reaction acid; no albumen.

LOBAR PNEUMONIA.

CASE 1.

Enteric fever.

W. P.; aged forty years; nativity, Michigan; admitted to U. S. Marine Hospital, Detroit, Mich., August 25, 1888; died September 11, 1888.

History.—Patient had been sick five days when admitted, and was then very weak. He had been delirious at times and had spit up some blood, also coughed some and had diarrhœa and fever. His temperature on admission was below normal, and his pulse very weak. He had a cough, with no expectoration, and his diarrhœa had left him for several days. There were some bronchial râles, with increase in vocal resonance and in area of tubular breathing over upper lobe of right lung. The diarrhœa soon returned. In spite of the free use of stimulants he died of exhaustion at 3 a. m., September 11, 1888.

Necropsy (six hours after death).—*Rigor mortis* slight. Body emaciated. Heart, normal; weight, 330 grams; *ante-mortem* clot in right ventricle. Lungs small; weight of right, 365 grams; of left, 340 grams; no signs of consolidation, but some congestion of upper lobe of right lung. Liver and spleen enlarged and congested; weight of former, 2,260 grams; of latter, 320 grams. Many mesenteric glands much enlarged and Peyer's glands in the ileum in various stages of inflammation and ulceration, the latter process in some cases having reached the peritoneal coat. Kidneys, normal; right weighing 190 grams; the left 197 grams.

CASE 2.

T. H.; aged twenty-four years; nativity, Virginia; admitted to U. S. Marine Hospital, Cairo, Ill., December 13, 1888; died December 18, 1888.

History.—On admission patient stated he had gotten wet six days before and caught cold. Had no medical treatment. When admitted, pulse, 120; temperature, 39.8°C.; respiration, 60; dyspnœa marked, and complained of a severe pain in side. On auscultation and percussion inferior lobes of both lungs found silent. Rusty sputa. Turpentine stupes were applied, and fluid extract of jaborandi with quinia in full doses; carbonate of ammonia, muriate of ammonia; whisky, milk, and opium were freely used.

Necropsy (twenty hours after death).—*Rigor mortis* well marked. Body, that of a well-nourished negro; somewhat emaciated; lower half of body covered with syphilitic petechiæ. Abdomen, notably devoid of fat. Stomach, dilated and partly filled with curdled milk. Liver, enlarged, mottled, nutmeg; adherent to diaphragm; weight, 2,250 grams. Gall-bladder moderately full of viscid, tarry bile. Right kidney enlarged; capsule adherent. Left kidney somewhat fatty, congested. Spleen, softened; on section, showing pus; enlarged and flabby. Heart, filled with dense *ante-mortem* clots, extending some distance into aorta; left ventricle, hypertrophied; aortic valve, incompetent; right ventricle, thinned and softened; right pleural cavity filled with pus and lymph; left pleura, obliterated; left lung, inferior lobe hepatized, breaking down; superior lobe, congested; right lung, inferior lobe hepatized throughout; superior and middle lobes congested.

CASE 3.

A. C.; aged twenty years; nativity, Indiana; admitted to the U. S. Marine Hospital, New York, October 17, 1888.

History.—Had been feeling sick several days. Was taken at first with a severe chill which lasted for two hours and was followed by fever. On admission, tongue coated with a thick fur, eyes suffused, pain and tenderness over spleen, temperature

37.8° C. He was ordered quinine and antifebrine. On the 18th he had epistaxis and his temperature rose to 39° C. in the morning and fell to 38° C. in the evening. On the 19th his temperature again rose to 39° C. and during the night he had a chill. On the morning of the 20th his temperature was 37.5° C. and he had a persistent cough, accompanied by pain in his right side. Physical examination on the 21st revealed the existence of a pneumonia of the middle and lower lobe of the right lung. The cough, pain, and rusty expectoration continued and the patient gradually sank and died on the 24th, eight days after admission.

Necropsy (six hours after death).—Rigor mortis marked; right lung covered with a thick yellow exudate, which agglutinated the lobes to each other, and the entire lung to the parietes; this membrane could be easily detached. There was gray hepatization of the upper lobe, red hepatization of the middle and lower lobes; weight, 1,120 grams; left lung attached at its lower portion by old fibrinous adhesions, caused by a recent attack of pneumonia; weight, 365 grams. Pericardium filled with cloudy serum. Heart covered with a papilliform exudate, but otherwise normal; weight, 400 grams. Liver, circumscribed perihepatitis on anterior surface of right lobe; weight, 2,250 grams. Spleen, fibrous thickening. Other organs normal. Brain not examined.

CASE 4.

C. B.; aged thirty-six years; nativity, Sweden; admitted to the U. S. Marine Hospital, New York, October 12, 1888.

History.—Had a chill three days ago and another on yesterday; has recently returned from a cruise in the West Indies; has had epistaxis for past three days; no diarrhea. During the night of the 12th the patient became delirious, and about 8.30 a. m. on the 13th he became unconscious, breathing rapid and pulse compressible. He reacted under stimulation, and about 5 p. m. became violently delirious and had irregular clonic spasms. He was given anti-spasmodic remedies, and cold applications made to his head. Physical examination showed commencing consolidation of the right lung. He passed a restless night, being delirious most of the time, and died on the morning of the 14th.

Necropsy (seventeen hours after death).—Rigor mortis marked. Livores over entire body; most marked in dependent portions. Anterior surface of forearm tattooed with C. C. B. M. Heart: weight, 400 grams; normal. Right lung generally adherent by old fibrous adhesions. Upper and middle lobes in state of gray hepatization. Lower lobe engorged. Weight of entire lung, 1,290 grams. Left lung generally adherent. Hypostatic congestion. Both kidneys normal. Weight right kidney, 175 grams; weight left kidney, 200 grams. Capsules non-adherent. Stomach, intestines, and bladder and liver normal. Spleen soft, pultaceous; weight, 200 grams. Brain: blood-vessels of pia mater engorged; ventricles and meninges normal.

CASE 5.

A. W.; aged twenty-five years; a native of New York; admitted to the U. S. Marine Hospital at Baltimore, Md., February 15, 1889; died February 20, 1889.

History.—Was sick five days previous to admission to hospital with cough, expectoration, pain in side, dyspnea, prostration, and fever. Examination showed double pneumonia; was given 30 cubic centimeters of whisky every two hours and 5 grains of ammonia carbonate every four hours. Pulse, 120; temperature, 40½° C.

February 15.—Pulse, 132; temperature, 39° C.

February 16.—A. m. pulse, 120; temperature, 39° C.; p. m. pulse, 120; temperature, 39°.

February 17.—A. m. pulse, 120; temperature, 39° C.; respiration, 48.

February 18.—Pulse, 120; temperature, 38.2° C.; p. m. condition the same.

February 19.—Pulse, 120; temperature, 38° C.; profuse expectoration; condition worse.

Necropsy (sixteen hours after death).—Rigor mortis well marked; body fairly nourished. The left lung was adherent to the contiguous parietes by recent fibrinous bands; the whole of the left lung was in a state of gray hepatization; the bronchi filled with muco-pus. The right lung was adherent at its lower portion by old fibrinous bands; the lungs were œdematous, and encysted; slight amount of muco-pus in the small bronchi. The liver was slightly enlarged, and fatty over its surface. Kidneys large; blood-vessels much congested; otherwise normal in appearance. Heart found in diastole; all cavities filled with soft clots; other organs normal. Brain not examined.

CASE 6.

P. K.; aged forty-two years; admitted to the U. S. Marine Hospital at Baltimore, Md., from the schooner *Emily Washington* January 2, 1889; died January 6, 1889.

History.—Had been sick three weeks before entering hospital; perfectly well before that time. Began with sore throat and pain in chest; sleepless; appetite poor; coughed considerably; expectoration yellow, slightly rusty and tough; nose obstructed; pain below right nipple, especially when taking a long breath. Pulse, 120; temperature, $39\frac{1}{2}^{\circ}$ C.

February 3.—Temperature, $38\frac{1}{2}^{\circ}$ C.; pulse, 100; much pain; rested poorly during the night; constipated. Ordered syr. scillæ, tr. opii, camp. aa 30 c. c., tr. capsici 3 c. c.; a teaspoonful every three hours. P. m. pulse, 120; temperature, $39\frac{1}{4}^{\circ}$ C. Coughed considerably; expectoration tough and rusty.

February 4.—Temperature, 38° C.; pulse, 100. Much pain; rested poorly during the night; tongue very dry; cough not so bad; vomiting; one stool. Was given .18 gram of quinine every two hours. P. m. temperature, 40° C.; pulse, 132. Delirious most of the day. Morphia sulph. .007 gram given.

February 5.—Temperature, 39° C.; pulse, 108. Patient restless and delirious during the night. Potas. bromid. 1 gram every three hours; other treatment discontinued. P. m., very delirious; passed urine in bed. Given 15 c. c. spiritus frumenti every two hours.

February 6.—Temperature 40° C.; pulse, 114. Was quiet during the day; stupid and delirious. Spiritus frumenti 30 c. c. every three hours. Died at 5 p. m.

Necropsy.—The right lung, except a small area at the apex, showed all of the signs of the second stage of croupous pneumonia, viz, loss of crepitation, congestion, dark color, friable, a fibrinous plenrisy, fragments sunk in water, and the cut surface presented small granular bodies. The left lung showed collateral congestion and œdema. The heart, especially the left ventricle, was hypertrophied, but no valvular lesion existed. The kidneys were the seat of active hyperæmia.

CASE 7.

A. S.; aged fifty-six years; nativity, Baltimore; admitted to U. S. Marine Hospital, Stapleton, N. Y., August 24, 1888; died August 26, 1888.

Necropsy (twenty-five hours after death).—Rigor mortis marked: Livores. Right forearm tattooed, Adolphus J. Schutze, over eagle surmounting shield with flags and crossed cannon; left arm, female figure with anchor and flags. H O P E on flag. Double heart with arrows and gripped hands. Heart: valves, normal, ante-mortem clot in right ventricle and auricle, plugging artery. Right lung completely solidified, gray hepatization. Left lung, œdematous. Liver, normal; gall bladder distended. Kidneys, parenchymatous nephritis in both; spleen, small, normal; stomach, intestines, and bladder, normal; brain, not examined.

CASE 8.

P. R.; admitted to the marine ward of the Sisters' Hospital, Buffalo, N. Y., May 10 1889; died May 14, 1889.

Of this case no history could be obtained except from the captain of the vessel, who could only state that he had caught cold and had taken to his bed and had been de-

lirious since the third day of his attack, which had now lasted seven days. He was brought to the hospital about midnight by ambulance.

The patient was *in articulo mortis* when admitted, and died early on the morning of the third day, never having regained consciousness.

Necropsy.—The left heart was almost entirely filled with a *post mortem* clot extending between the valves. The blood corpuscles were remarkably shrunken and the proportion of white to red was increased so that the white seemed almost equal in number to the red. The upper lobes of both lungs and the lower lobe of the left were solidified. The brain tissue showed but few points of redness upon section, though the superficial vessels were deeply congested. Death from exhaustion. *Rigor mortis* absent.

CASE 9.

J. S.; aged twenty-eight years; nativity, Africa; admitted to the U. S. Marine Hospital at New Orleans, La., May 23, 1889; died May 28, 1889.

History.—The patient stated that he had been very ill for the past seven days. He was first taken with a severe chill, which was followed by fever and pain in the right side; soon afterwards cough set in, accompanied by bloody, frothy expectoration. On admission the patient was found to be in a critical condition; temperature, 38°; pulse, 100; respiration, 40; expression of face anxious and stupid; slight muttering delirium was present. On physical examination consolidation of inferior and middle lobes of right lung was detected, as also a general capillary bronchitis. The patient's breathing was difficult and expectoration bloody. He was put on ammon. carb. .30 gram, and tr. digitalis gtt. 10, every two hours; poultices were applied to chest, and milk punches ordered every two hours. The condition of the patient continued about the same for two or three days. He then began to show marked symptoms of exhaustion, accompanied with delirium and rapid, feeble pulse, ending finally in death May 28, 1889.

Necropsy (fifteen hours after death).—External appearance: Body that of a negro of medium height and well built. Thorax: The surfaces of the pleura of right side were glued together by newly-formed lymph, which could be easily broken up. Lungs: The lower and middle lobes of right lung were consolidated, the peripheral portion of the consolidated area being in a state of red hepatization, while the more central part had already advanced into the state of gray hepatization. The rest of the right lung and the whole left lung showed great congestion, and the bronchi and bronchioles were filled with frothy, bloody mucus. Heart normal in size; both ventricles were filled with clots; the valves were normal. Abdominal cavity: The liver was enlarged and slightly congested; spleen enlarged; intestinal canal normal; kidneys congested. Brain not examined.

CASE 10.

W. L. (colored); aged thirty-two years; nativity, Mississippi; admitted to the U. S. Marine Hospital, Chicago, Ill., May 9, 1889; died May 11, 1889.

History.—Patient had been sick three days before entrance, having fallen overboard one week prior to the initial symptom, a chill; the patient coughed considerably, but the sputa was at no time colored; on admission the left lung gave slight dullness on percussion; tubular breathing over the entire left side, but not a râle in the chest or either side; the following morning the entire left lung was dull, and the tubes of both sides were full of mucus; quinine and stimulants were given, with morphine, and he was cautioned about leaving his bed, which he desired to do. A few hours after sick-call he arose, while the nurse was at the opposite end of the ward, and suddenly expired in a chair.

Necropsy (six hours after death).—*Rigor mortis* marked; heart contained an *ante-mortem* clot in the aortic opening, as well as one in the entrance of the pulmonary artery; the right auricle was filled with an *ante-mortem* clot; the left lung was in the stage

of red hepatization, being completely solidified, and pieces sank in water; the right lung was engorged, but not solidified; a few pleuritic adhesions existed on the right side; the liver was enlarged and congested. Spleen, kidneys, and intestines were normal.

CASE 11.

O. G. (colored); aged twenty-five years; a native of Kentucky; was admitted to the U. S. Marine Hospital, Memphis, Tenn., February 4, 1889, and died a few hours after admission. He had been treated in the hospital and at the office for syphilis and malarial fever.

History.—Patient, on admission, complained of urgent dyspnoea, amounting to orthopnoea at times, pain in chest, cough and great debility. He has been sick two weeks, and has had scarcely any nourishment or attention. Physical examination shows the pulse to be 90, rather weak, and the respirations 50, dullness over right lung, with subcrepitant râles. Death came suddenly at 9.30 p. m., six hours after admission.

Necropsy.—Sears in both groins; viscera normal, except right lung, which was in the stage of resolution; the intestines were completely empty; spleen enlarged; liver weighed 2,410 grams, spleen 610, right lung 780, left 710, heart 574, right kidney 242, left 217.

CASE 12.

J. H. J. (colored); aged thirty years; nativity, West Virginia; admitted to the U. S. Marine Hospital, Detroit, Mich., May 9, 1889; died May 14, 1889.

History.—On admission patient complained of pain in left infra-axillary region on breathing, coughed a great deal, and had expectorated some blood; he also had considerable diarrhoea, and his tongue was coated with a whitish fur. Temperature on admission 40° C., pulse, 92; respiration, 43 per minute; very shallow.

Necropsy (six hours after death).—*Rigor mortis* slight. Heart pale, ventricles filled with firmly organized clots. Pericardium contained a little fluid and two small white bodies resembling peas free and floating; another smaller one encysted in the wall of the pericardium, behind the heart, also another attached to the wall of the pulmonary artery, about 1½ inches from the ventricle, by a thread-like pedicle about an inch in length. No evidence of previous inflammation of pericardium. Left lung completely hepatized, weight 1,600 grams. Evidences of recent pleurisy in left infra-axillary region. Right lung somewhat congested. Liver also congested; weight, 2,620 grams.

CASE 13.

Cirrhosis of the liver.

W. S.; aged forty-one years; born in New York; admitted to the U. S. Marine Hospital, New York, March 25, 1889; died March 27, 1889.

History.—On admission there was dullness over the entire right lung, with exaggerated vocal resonance and marked tubular breathing. There were a few crepitant râles over upper lobe of left lung. Pulse 120, temperature 39.2°, respiration 48. He sank rapidly in spite of supporting treatment, whisky, etc., and died at 7 a. m. March 27, 1889.

Necropsy (seven hours after death).—Livores on extremities and posterior surface of body. *Rigor mortis* marked. Cicatrix of bubo in right groin; right lung adherent by recent bands of yellow lymph, more easily detached anteriorly; weight 1,255 grams. On section there was gray hepatization of upper, and upper portions of middle lobe and œdema of lower lobe. In the central portion of the middle lobe was found an abscess cavity filled with cheesy pus, and surrounded by an inflammatory exudate. Left lung attached by firm adhesions; weight 940 grams; on section, gray hepatization of upper lobe, and œdema of base of lung. Heart weighed 219 grams; muscle

and valves normal. Liver weighed 2,640 grams; was attached to the peritoneum and diaphragm by old adhesions. The surface of the liver was fissured and lobulated; on section, fatty degeneration of acini with hypertrophy of connective tissue. Spleen weighed 584 grams; thickening of capsule on anterior surfaces; splenic pulp soft and of dark red color. Left kidney weighed 205 grams, flattened, and about 14 centimeters in length. Right kidney, weight 225 grams; normal. Stomach, intestines, and bladder normal. Examinations were made of the blood, lungs, liver, kidneys, pleuræ, and spleen, for Frankel's pneumococcus, and they were found in the blood, spleen, kidney, liver, and lungs.

CASE 14.

Miliary tubercle and aortic stenosis.

T.M.; aged twenty-six years; nativity, America; admitted to U. S. Marine Hospital, Cincinnati, Ohio, June 6, 1889; died June 9, 1889.

History.—Patient was under treatment in the hospital during the past winter for valvular disease of the heart. After his discharge he was treated as an out patient until May 2, when his visits abruptly terminated. The apex beat then was displaced downward to the seventh interspace; the impulse was forcible, and pulse 102. At some of his visits a murmur could be heard at the base to the left of the sternum, while at other visits the closest examination failed to reveal any abnormal sound further than a valvular quality of the second sound. On May 2, his last visit, the heart was acting more quietly than it had done since he first came under treatment. He was not seen again until brought to the hospital almost moribund on June 6. He was cyanosed, speechless, and utterly helpless. A relative who accompanied him stated that he had had a hemorrhage three weeks before, since which time he had been rapidly growing worse. This was all the history that could be obtained of his recent illness. Loud, moist, and bubbling râles were heard over both lungs; the heart sounds were rapid, and so weak as to be almost obscured by the râles. Temperature 37.5; pulse 103; respiration 45. He lingered in a lethargic condition until the evening of June 9, when he expired very quietly.

Necropsy (sixteen hours after death).—Body emaciated; *rigor mortis* well marked; hypostatic congestion posteriorly. Pericardium congested, contains about 40 cubic centimeters of straw colored fluid. Heart large and flabby; muscular substance softened; both sides contain *post-mortem* clots; right and left auricle, and left ventricle greatly dilated; right ventricle also dilated but to less extent. Marked stenosis of aortic opening which is but slightly more in circumference than the little finger. The aorta seems narrowed throughout. Weight of heart 455 grams. Right lung has a large deposit of miliary tubercles at apex which extend downward along the outer border to base; the central and inner portions of this lung not appearing to be affected. A thick, purulent fluid escapes from cut surface of the diseased portion. Left pleura intensely inflamed; left lung so firmly adherent to chest wall it is difficult to detach it; it is solid from apex to base, and studded with miliary tubercles. Peritoneum, stomach, and intestines congested. Liver normal in appearance; weight 1,630 grams. Spleen pale, and somewhat enlarged; weight 230 grams. Right kidney infiltrated with fat, and medullary portion partially destroyed; weight 290 grams. On upper surface of left kidney there is a cyst containing about 15 cubic centimeters of a straw colored fluid. Its walls were formed of calcareous matter of almost bony hardness, and about the thickness of the shell of a hen's egg; weight of kidney 160 grams.

CASE 15.

E. McN.; aged twenty-four years; nativity, Illinois; admitted to U. S. Marine Hospital, Cincinnati, Ohio, March 6, 1889, with well marked symptoms of lobar pneumonia; died March 11, 1889.

History.—Patient stated that he had been feeling perfectly well up to the day previous to admission, when he had a severe chill. Since then he had suffered from nausea, headache, pain in the chest and limbs, and cough. The day before death a large bed sore developed over the sacrum. He died of heart failure on the date above given.

Necropsy (five hours after death).—*Rigor mortis* not well marked; body well nourished; hypostatic congestion posteriorly: bed sore over sacrum; pericardium pale; contains about 100 cubic centimeters of fluid; heart somewhat enlarged; cavities on both sides contain fibrinous clots; tricuspid valve thickened, and one cusp bound down so as to be of little or no use; a recent deposit of lymph over external surface of both lungs and pericardium; left lung congested, but not solidified; crepitates in all portions; right lung firmly adherent to chest wall; solidified from base to apex, and in a state of red hepatization: thick pus exudes from cut surface on pressure; substance of lung so soft as to be easily penetrated by the finger, and crumbles like cottage cheese; a like consistence of substance is found in the liver, spleen, and both kidneys: the liver is enormously enlarged; weight 4,608 grams.

CASE 16.

H. H. (colored); aged twenty-five years; nativity, Virginia; admitted to the U. S. Marine Hospital, Cincinnati, Ohio, February 7, 1889; died February 14, 1889.

History.—Extremely ill with pneumonia when admitted; symptoms those usually obtained in this disease. Death occurred from heart failure seven days after admission.

Necropsy (four hours after death).—*Rigor mortis* well marked; somewhat emaciated; abdomen distended. Pericardium contains about 30 cubic centimeters of serous fluid. Fluid blood and a fibrinous clot in both cavities of heart. Right ventricle hypertrophied; left ventricle dilated and walls much thinned. Left pleural cavity contains about 300 cubic centimeters of fluid. Both lungs adherent to chest walls; a recent thick deposit of lymph over surface of left lung; the lower third of this lung was in a state of gray, while the upper two-thirds was in a state of red hepatization; right lung congested and collapsed. Liver intensely congested; weight 2,560 grams. Other organs apparently normal.

[It may be of some interest to note that the nurse who assisted at this necropsy accidentally grazed the skin from his hand just before touching the body and died of blood poisoning ten days after. The abrasion was so small as to be scarcely perceptible; the cuticle only appeared involved. Symptoms of blood poisoning manifested themselves within twelve hours.]

CASE 17.

Enteric fever.

H. A. (colored): aged, twenty years; nativity, Kentucky; admitted to the U. S. Marine Hospital, Cincinnati, Ohio, January 17, 1889; died January 22, 1889.

History.—Upon admission patient complained of pain in the right hypochondriac region. He stated that he had been sick a week, during which time he had had a chill every day. Being far from intelligent his statement was not considered reliable. His temperature was 41°; pulse 104. Two hours after admission he became delirious, in which condition he remained up to death. There was dullness on percussion over right side of thorax from infra-mammary to middle of infra-clavicular region; respiratory murmur in this locality was very feeble. On left side resonance was increased, and respiratory murmur exaggerated. No cough. Tenderness and gurgling in right iliac fossa. Tongue thickly coated, dry, and edges red. The first two days after admission the feces were passed involuntarily, after that there was no movement of the bowels. On the second day the abdomen became tympanitic. Death occurred from heart failure January 22. The temperature curve was that of a typical case of enteric fever. Treatment was mainly stimulant.

*Necropsy (twelve hours after death).—*Body fairly well nourished; abdomen distended; *rigor mortis* well marked. Pericardium contained about 15 cubic centimeters of fluid. Heart, normal; a fibrinous clot in both ventricles. Right lung adherent to chest wall; solid from base to lower third of upper lobe, and infiltrated with pus; sinks rapidly when placed in water. Weight, 1,080 grams. Left lung so completely collapsed and closely adherent to posterior thoracic wall that pleural cavity on that side appears empty. In size this lung is scarcely double that of the spleen; weight, 352 grams; floats in water. Intestines distended with gas, and congested; large intestines adherent to abdominal walls. Mesenteric glands greatly enlarged; Peyer's patches inflamed. Liver weighs 2,112 grams; spleen, 224 grams. Kidneys apparently normal.

CASE 18.

D. P.; aged fifty-five years; nativity, Norway; was admitted to the U. S. Marine Hospital, at the port of New York, January 26, 1889, suffering from the results of submersion in the water and exposure. Examination revealed the existence of pneumonia in the lower lobes of both lungs. The patient died January 28.

Necropsy.—Body that of a well-nourished adult male. *Rigor mortis* strongly marked. Sores were present on the extremities. The right lung weighed 1,675 grams, and contained cheesy deposits in the upper lobe, more especially in the apex. On the anterior margin of the upper lobe was found a calcareous deposit, circular in shape and about a centimeter in diameter. The middle lobe had undergone purulent infiltration. The lower lobe was in a state of red hepatization, with foci of commencing purulent infiltration. The left lung was found about normal in its upper lobe. The lower lobe was intensely engorged with commencing hepatization. The lung weighed 615 grams. The heart weighed 345 grams. The left ventricle was slightly hypertrophied concentrically. The valves were all competent. The liver weighed 1,960 grams; was fatty, and mottled upon the surface. The gross appearance of the kidneys was normal. In the right, which weighed 170 grams, was found an anomalous distribution of the blood-vessels, a branch of the renal artery entering the organ above the hilum and dividing in the substance of the organ. A small cyst (commencing hydronephrosis) was found on section. The left kidney, having a weight of 200 grams, revealed upon section a cyst somewhat larger than that in the right.

CASE 19.

Catarrhal inflammation of stomach.

T. B.; aged thirty-one years; nativity, Finland; was admitted to the U. S. Marine Hospital, port of New York, March 14, 1889, suffering with catarrhal inflammation of the stomach, anorexia, fever, and pain in the epigastrium, and gave a history of having been a hard drinker. Four days after admission an examination revealed the development of pneumonia in the upper lobe of the right lung. The condition of the patient from this time grew steadily worse until his death, which took place March 21.

Necropsy.—Body somewhat emaciated; *rigor mortis* well marked; extravasation of blood was present about the chest and neck. The left lung weighed 420 grams. There was well marked œdema, the lung being full of frothy, bloody effusion, as well as being much congested. The right lung was very large, firm, and dense, weighing 2,100 grams. The upper lobe was in a state of gray hepatization, passing into purulent infiltration. The lower lobe was in a transition stage from red to gray hepatization. The heart was normal, and all its valves competent. The liver was fatty, friable, and engorged, weighing 2,265 grams. The spleen was lobulated, dark purple in color, and normal in size. The tissue was intensely red on section. The organ weighed 190 grams. The kidneys were normal, the left weighing 195 grams and the right weighing 200 grams. The stomach presented the appearances of a chronic catarrhal inflammation, the mucous membrane being thickened and the rugæ larger and more numerous than normal.

CASE 20.

J. C.; aged thirty years; native of Virginia; was admitted to the U. S. Marine Hospital at the port of New York, September 3, 1888, suffering from syphilitic disease of the testicle. September 4 the testicle was removed by Passed Assistant Surgeon Armstrong. Complete recovery from the wound took place, but the patient relapsed into a cachectic condition, from which he never completely recovered. February 17, 1889, he was taken with pleurisy and pneumonia, and was soon suffering with extreme dyspnoea. He died February 19.

Necropsy (six hours after death).—Body of a rather small, white adult male. Marks of former surgical operations were seen upon the right leg and left clavicle. The left pleural cavity was found to contain a quantity of fluid, and recent fibrinous exudate. The left lung was consolidated in its entire lower lobe, and was in the condition of gray hepatization, with evidences of commencing purulent infiltration. The upper lobe was engorged, and presented appearances of fibrinous exudation. The lung weighed 1,145 grams; the weight of the right lung was 720 grams. This lung was the seat of oedema, which involved only the lower and middle lobes, however, the upper lobe being normal. The heart seemed larger than normal, and the tissue was flabby and anæmic in appearance. The right ventricle was the seat of eccentric dilatation. There were inflammatory deposits on the pulmonary valves, but the valves were competent. The mitral and aortic valves were normal. The liver weighed 3,490 grams; was fatty, and was enlarged, especially in the right lobe. The right kidney weighed 295 grams, and was large, and buffy in color. The left kidney was also buffy, and weighed 290 grams. The spleen was about one-fourth larger than normal; was slaty gray externally, and showed fatty upon section. The brain weighed 1,375 grams, and was normal in appearance.

CASE 21.

H. E.; aged eighteen years; nativity, Ohio; was admitted to the U. S. Marine Hospital, Cairo, Ill., February 10, 1889. Died February 14, 1889.

History.—On admission, pulse 144, bounding; temperature, 39° 75 C.; respiration, 60, superficial. Complained of severe pain over left lung. On percussion, dullness, and on auscultation bronchial respiration over left side of chest. Right lung silent. Rusty sputa. Treatment: turpentine stupes, quinine, digitalis, carbonate and muriate of ammonia, whisky and milk.

Necropsy (thirty-one hours after death).—*Rigor mortis* marked. Body that of a muscular, well-nourished young man. Abdomen discolored. Pericardium adherent. Heart enlarged, somewhat fatty, filled with blood and serum; left ventricle containing *ante mortem* clots. Aortic valve incompetent, somewhat fatty. Liver congested, enlarged, weight 2,750 grams. Spleen enlarged. Gall bladder full of tarry bile. Kidneys, right containing pus; left congested and somewhat enlarged. Pleuræ obliterated. Left lung hepatized, and containing pus. Right lung replaced by mass of broken-down tissue.

CASE 22.

Intermittent fever. Supernumerary rib.

J. C.; aged fifty-one years; nativity, Louisiana; admitted to the U. S. Marine Hospital, St. Louis, Mo., May 27, and died May 30, 1889.

History.—When admitted, patient stated he had been sick about three weeks from chills and fever, pain in the chest, difficulty of breathing, expectoration of yellow sputum, and considerable prostration. He rapidly declined, and became semi-comatose two days before death.

Necropsy (sixteen hours after death).—*Rigor mortis* marked. Body was considerably emaciated. Right pleura adherent to about two-thirds of the chest-wall; left pleura reddened and covered with lymph. Right lung deeply engorged with blood and a

yellow, frothy fluid, the lower lobe mainly affected, containing but little air and being of a doughy feel. Left lung congested in lower part, but normally crepitant to the touch. Heart, small, covered with fat at the base. Stomach, normal. Liver very much congested with blood, and, in consequence, markedly enlarged. Spleen, congested, fragile, and very dark in color. Kidneys contained some fat in their central portions. It was noticed that there were thirteen ribs on the left side (the usual number on the right), the extra one seeming to occupy the fourth intercostal space, of perfect shape, and having a common costal cartilage with the fifth rib proper. There was no increase in the number of spinal vertebrae as far as could be determined.

CASE 23.

A. H.; aged fifty-six years; nativity, Germany; admitted to the U. S. Marine Hospital, St. Louis, Mo., April 3, 1889; died April 5, 1889.

History.—Patient stated that he had been sick several days before admission with severe cough, high fever, and much difficulty in breathing. Temperature, 40.3° C.; decided prostration; dyspnoea; rapid, shallow respiration; free expectoration of frothy, blood-streaked mucus. Dullness over bases of both lungs, more marked on the left side; coarse mucus râles on both sides; diminished respiration.

Necropsy (twenty hours after death).—*Rigor mortis* marked. Body emaciated. Pleuræ adherent in front about the bases; surfaces covered with a yellowish-white exudation. Lungs both congested, the left one heavily charged with blood and frothy mucus, very heavy, sinking in water; congestion in right lung limited to the base. Heart normal. Liver very much congested.

CASE 24.

Inflammation of stomach.

J. W. (colored); aged thirty-five years; nativity, Tennessee; admitted to the U. S. Marine Hospital, St. Louis, Mo., January 18, 1889, for intermittent malarial fever; readmitted February 8, 1889; died February 9, 1889.

History.—In addition to the usual symptoms of pneumonia there was persistent vomiting from the first day in the hospital.

Necropsy (twenty-two hours after death).—Body emaciated. *Rigor mortis* present. Pleuræ slightly adherent in places. Right lung in second stage of inflammation; a purulent bloody fluid oozed from cut surfaces, which resembled sections of congested liver. Left lung congested. Heart, left side, hypertrophied, otherwise normal. Stomach, dark blue color on internal surface; denuded of epithelium, especially at the pyloric extremity; rugæ very much enlarged. Liver congested. Spleen and pancreas normal; head of pancreas denser than usual. Kidneys both very small; capsules adherent.

CASE 25.

J. H. J. (colored); aged thirty years; nativity, West Virginia; admitted to the U. S. Marine Hospital, Detroit, Mich., May 9, 1889; died May 14, 1889.

History.—The patient stated that he had been coughing for two or three weeks, and that ten days ago he had a severe chill, followed by fever. The patient not being where he could consult a physician procured a bottle of "Dr. Bull's cough syrup" and remained on board his vessel, although unable to perform his duties. He also stated that he had considerable diarrhea, and the last two or three days expectorated a small amount of blood, and that respiration caused considerable pain. On admission his temperature was 40° C.; pulse, 92; respiration, 43 and shallow; diarrhea considerable; tongue coated with a white fur; respiration painful, especially in the left infra-axillary region. Physical examination revealed a friction sound in the infra-axillary region of the left side, indicative of pleurisy at that point,

and moist râles at the lower portion of the infra-clavicular and the upper part of the mammary regions of the left side. There was dullness on percussion on the left side. The right side gave increased resonance on percussion, and also an increase in the respiratory murmur on auscultation. The sputa was of the characteristic "prune-juice" color. The breathing was labored, and gradually became more difficult until all the accessory muscles were brought into play, giving the typical "facies pneumoniae." Death apparently from heart failure. A few hours before death a copious evacuation of the bowels. The temperature, respiration, etc., were as follows:

May 10.—A. M., temperature, 40° C.; pulse, 92; respiration, 43. P. M., temperature, 40.6° C.; pulse, 91; respiration, 44.

May 11.—A. M., temperature, 40° C.; pulse, 97; respiration, 42. P. M., temperature, 38.6° C.; pulse, 90; respiration, 42.

May 12.—A. M., temperature, 39.6° C.; pulse, 90; respiration, 42. P. M., temperature, 40° ; pulse, 90; respiration, 46.

May 13.—A. M., temperature, 38.6° C.; pulse, 87; respiration, 43. P. M., temperature, 40° C.; pulse, 95; respiration, 52.

May 14.—A. M., temperature, 38.5° C.; pulse, 130; respiration, 63.

Necropsy (six hours after death).—Slight rigor mortis. Thorax: Heart pale and ventricles filled with firmly organized clots; weight, 350 grams. In the pericardium was found a small amount of fluid and two small, round, white bodies, free, resembling large white peas; another, smaller, encysted in the wall of the pericardium behind the heart; also another, attached to the wall of the pulmonary artery, about $1\frac{1}{4}$ inches from the ventricle, by a thread-like pedicle, about an inch in length. There was no evidence of a previous inflammation. The left lung was found to be completely hepatized; weight, 1,600 grams. There was also evidence of a recent pleuritis in the side of lower part of the lower lobe of the left lung. Right lung congested in appearance but did not sink in water; weight, 670 grams. Liver congested; weight, 2,620 grams. Gall-bladder empty. Spleen, appearance normal; weight, 110 grams. Kidneys normal in appearance; weight of right kidney, 230 grams; left kidney, 270 grams.

CASE 26.

A. G. O.; aged thirty-two years; nativity, Norway; admitted to the U. S. Marine Hospital, San Francisco, Cal., March 9, 1889; died March 12, 1889.

*Necropsy (fifteen hours after death).—*Body well nourished; physique vigorous. Face and upper part of body jaundiced; dependent portions echymosed; abdomen distended. Right pleural cavity nearly obliterated by numerous weak bands of adhesion; there were numerous flakes and patches of fibrinous matter over the lung; no fluid. About the lower two-thirds of right lung were solid with pneumonic exudation; the rest of it was very much congested and œdematous. Left lung congested and œdematous; it was everywhere bound down by thin and feeble pleuritic adhesions without serous exudation. Heart presented nothing of note. Pericardial fluid increased (50 cubic centimeters). Liver was swollen and congested, somewhat fatty. Gall-bladder nearly empty. Spleen normal. Kidneys were both very large, about one and one-half times normal size, but presented no pathological feature except, perhaps, a degree of fatty change in their cortices.

CASE 27.

L. B.; aged forty years; nativity, Germany; admitted to the U. S. Marine Hospital, San Francisco, Cal., March 22, 1889; died, March 31, 1889.

Necropsy (twenty-four hours after death).—Rigor slight. Body well nourished, conjunctiva and skin of face and neck somewhat jaundiced. Chest: The left lung was considerably congested posteriorly, and the whole organ was apparently emphysematous throughout numerous limited areas. There was some 150 cubic centimeters serum in the pleura and a strong and broad adhesion at the outer and lower border

of lung. The right lung was nearly everywhere adherent to pleura; the upper lobe and a small portion of anterior upper region of lower lobe were solidly pneumonic, while the greater part of the lower lobe posteriorly was almost equally disabled from collapse and congestion. The heart was very fatty. It was markedly enlarged—hypertrophy, with dilatation. It was flaccid and nearly empty, containing only in each cavity a little dark fluid blood, while just within the ventricles commenced a rather soft fibrinous clot, which was continued into the aorta and pulmonary arteries, through their respective orifices, as far as their main branches and well into the latter. That in the aorta was particularly large, half filling the tube. The liver was enlarged and of an extraordinary pale yellow or dirty reddish white color. It was friable and granular, and yet the capsule was not easily detached, and there was evidently fibrous proliferation throughout the organ, a double degeneration, fatty and cirrhotic. The gall-bladder was fused to the colon at the hepatic flexure, without apparently any damage to either. The spleen was two or three times the normal size, dark purplish, pulpy. The kidneys were each about one and one-half times the normal size, well rounded about the greater curvature. Upon section they appeared rather pale, quite fatty, and this appearance was almost equally marked in cortex and pyramidal portion, so that it was unusually difficult to distinguish the boundary between these divisions. Bladder about half full. The brain: The scalp was rather congested, and upon removing calvarium the dura was very markedly vascular. Upon incising this quite a quantity of serum escaped, and it was then observed that the membranes were quite oedematous everywhere, and at the vertex adherent at one or two points to the dura. There was considerable venous congestion, and at the base of the brain the subarachnoid space was full of serum and some delicate plastic adhesions were forming. The exudation was beginning to be seropurulent about the fissure of Sylvius. Upon section nothing remarkable was seen. There was little fluid in the ventricles, but the walls and commissures of the latter were softened, probably from long *post-mortem* maceration in the serous effusion.

CASE 23.

Pericarditis.

A. A.; aged thirty-nine years; nativity, Sweden; admitted to the U. S. Marine Hospital, San Francisco, Cal., January 21, 1889; died January 25, 1889.

Necropsy (six hours after death).—*Rigor* pronounced. Left lung had one or two pleuritic bands, old and firm, about the base, and the pleural cavity contained some 50 cubic centimeters of serum, tolerably clear. The lung itself was congested and somewhat oedematous. Right lung was covered over with a creamy fibrino-purulent exudation, and the pleural cavity contained some 500 cubic centimeters of sero-pus. The whole lower lobe was solid (red hepatization), and the upper regions of lung were very deeply congested, and oedematous. The pericardial sac contained about 25 cubic centimeters of sero-pus. The surface of the heart showed patches of exudation similar to that found in the right pleura, and the course of the vessels was marked by sero-purulent exudation. The organ itself appeared firm enough. The right lobe of the liver was considerably hypertrophied, the left decidedly atrophied. Both lobes were lobulated or nodular, and the capsule could not be detached without tearing up the very firm tissue beneath. The section showed up pale, fibrous, and firm—a well-marked hypertrophic cirrhosis. Spleen some three times its natural size, dark, rather firm. The right kidney was somewhat hypertrophied; the left decidedly so. Both were smooth, with easily detached capsules. The cortices appeared fatty, the pyramids pale.

ACUTE PNEUMONIC PHTHISIS.

CASE 1.

J. M.; aged twenty-six years; nativity, Maine; admitted to the U. S. Marine Hospital, Detroit, Mich., July 20, 1888; died July 23, 1888.

History.—This patient had been previously under treatment for acute pleurisy with effusion. The effusion seemed to become gradually absorbed, the upper lobe of the right lung giving nearly normal resonance on percussio; still the lower lobe presented the signs of consolidation; the fever continued, the cough became more troublesome, and the patient gradually grew weaker.

Necropsy (eighteen hours after death).—*Rigor mortis* slight; body emaciated. Right lung much enlarged and almost completely hepatized; it was firmly bound to chest walls by pleuritic adhesions. Left lung contained some small cavities and many scattered tubercles; pleuritic adhesions on this side less firm and extensive. Heart-valves normal; organized clot in left auricle. Kidneys normal; weight of right 200 grams, of left 210. Spleen enlarged; weight, 400 grams: its tissue softer than normal. The liver weighed 1,470 grams. This organ and the mesentery contained tubercles.

CASE 2.

J. D.; aged twenty-five years; nativity, Germany; admitted to the U. S. Marine Hospital, San Francisco, Cal., November 28, 1888; died December 2, 1888.

Necropsy.—The heart presented on its surface the appearance of fatty degeneration. The valves were competent and the walls fairly firm. There was a small white clot in the left ventricle. The right pleural cavity contained about 800 cubic centimeters of purulent fluid. The cavity also contained considerable gas. This lung was adhered by one band at its base, and by several at its apex. The remaining portions of the lung were compressed, and retracted, of the consistence of muscle, and occupying but a portion of its normal space. There was a cavity the size of a lime at its apex, and grayish pigment-stained nodules scattered through the entire lung. There was a communication between the lung and the pleural cavity through a small abscess on the surface. The left lung contained an abundance of miliary nodules. There was a small cavity at the upper part of the lower lobe.

CHRONIC PNEUMONIC PHTHISIS.

CASE 1.

J. N.; aged fifty years; nativity, Germany; admitted to the U. S. Marine Hospital, San Francisco, Cal., November 22, 1888; died November 26, 1888.

Necropsy.—Body greatly emaciated. The lungs only were examined. The right lung was bound down to pleura throughout. It was in a state of gray hepatization with nodules of caseation, except where broken down into cavities or foci of grumous pulp. In the upper lobe this breaking down was most noticeable. Left lung was mainly healthy, except for considerable œdema and congestion, in dependent portion especially. There was one considerable pneumonic node in the posterior middle region of this lung, and other cheesy nodules of old catarrhal exudation, apparently. Of discrete tubercles, granules, there were none.

CASE 2.

R. L.; aged forty-nine years; nativity, England; admitted to the U. S. Marine Hospital, San Francisco, Cal., November 30, 1888; died December 8, 1888.

Necropsy (thirty hours after death).—*Rigor* pronounced. The appearance of the lungs only need be noted. Both were everywhere bound down by pleuritic adhe-

sions, and full of cheesy nodules and small cavities. There were also in left lung, which was most diseased, a number of calcific concretions of small size. No discrete tubercle was seen.

CASE 3.

H. L.; aged twenty-two years; born in West Virginia; admitted to the U. S. Marine Hospital, Louisville, Ky., November 27, 1888.

History.—Had been ailing about two years, but lately has been running down fast. Has been treated with corroborants and tonics; died December 16, 1888.

Necropsy (twelve hours after death).—Thoracic and abdominal organs apparently healthy, with the exception of the lungs. Right lung filled with tubercles and cheesy matter with depots of pus. Left lung also in part tuberculous. Extensive pleuritic adhesions.

CASE 4.

J. S.; aged thirty years; born in Virginia; was admitted to the U. S. Marine Hospital, Louisville, Ky., November 13, 1888; died December 18, 1888.

Necropsy (twelve hours after death).—Left lung in a state of gray hepatization. Right lung in part permeable to air. Heart somewhat hypertrophied with no perceptible valvular lesion. Abdominal organs apparently normal.

CASE 5.

E. S.; aged forty-seven years; nativity, Vermont; admitted to the U. S. Marine Hospital, Chicago, Ill., May 29, 1888; died August 15, 1888.

History.—An acute attack of pneumonia, involving both lungs, occurred several months previous to admission to this hospital. Convalesced sufficiently to resume work as seaman. Cough never left him. Sailed three weeks until utterly exhausted. Endeavored to weather it for one month longer, and then applied for treatment. Pneumonic consolidation of upper lobe of both lungs. Under general tonic and supporting treatment he steadily improved. On the 5th of August he complained of severe occipital headache, which persisted in spite of all efforts to relieve it. On the 10th, low, muttering delirium developed, and continued until forty-eight hours before death, when he sank into a comatose condition. Pupils much dilated.

Necropsy.—*Rigor mortis* moderate. Body emaciated. Chest: At apex of right lung, several small areas of consolidation; one cavity, capacity about 5 cubic centimeters. Pleura non-adherent. Left lung bound firmly to posterior chest wall by old pleuritic adhesions. At apex was found cavity of about 15 cubic centimeters capacity, and several areas of consolidation. Heart normal. Cranium: Meninges greatly congested; sub-arachnoidean spaces and ventricles contained about 500 cubic centimeters of bloody serum; white and gray matter greatly congested.

CASE 6.

C. H.; aged twenty-three years; native of Norway; admitted to the U. S. Marine Hospital at Boston, Mass., August 15, 1888; died October 30. Patient had been suffering with symptoms of phthisis for seven months.

Necropsy (twelve hours after death).—*Rigor mortis* well established; body emaciated. Heart weighed 300 grams; normal. Left lung weighed 1,070 grams; adhesions about apex and posteriorly; entire lung solidified except lower part of lower lobe. On section the lung substance presented a dark surface, interspersed with small cavities filled with cheese-like material, larger in the upper lobe. Right lung firmly adherent throughout; weight, 1,760 grams; same appearance as left, except the cavities were larger and more numerous.

CASE 7.

N. B.; aged twenty-three years; nativity, Tennessee; admitted to the U. S. Marine Hospital, Cairo, Ill., March 7, 1889; died April 27, 1889.

History.—Gradual emaciation; cough, dyspnœa, night-sweats, and general weakness.

Necropsy (thirty hours after death).—Body that of a young negro much emaciated. Both plenræ obliterated. Lungs: Left, solidified and tuberculous; right, filled with pus and tuberculous masses. Heart coated with lymph and filled with *ante-mortem* clots. Liver small, congested; weight, 1,500 grams. Intestines studded with tubercle. Other viscera apparently normal.

EMPYEMA.

CASE 1.

P. K.; aged thirty-eight years; nativity, Ireland; admitted to the U. S. Marine Hospital, San Francisco, Cal., June 19, 1888; died July 5, 1888.

History.—When admitted he was in a typhoid condition, temperature 39° C.; tongue thickly coated; bowels constipated. On June 23 there was mild delirium and insomnia. On June 25 he complained of severe sharp pain in the chest, where pleuritic friction murmurs were plainly heard by auscultation, accompanied with slight dullness on percussion. The pain continued during the following three days. There was abundant expectoration of yellow mucus. The respirations numbered forty-five to the minute. From this time the symptoms continued with little change. There was nervous trembling and mild delirium almost continuously. The bowels became more active, there being from two to three movements in twenty-four hours, yellow in color.

Necropsy.—Upon opening the abdominal cavity the intestines were found to present a normal appearance, with the exception of a few spots of deeply colored congestion in the small intestine. The spleen was of normal size but softened, its pulp readily exuding from pressure of the fingers. The heart was of normal size and contained a fibrinous clot in the left ventricle. The right pleural cavity contained about 500 cubic centimeters of purulent fluid with much flocculent matter. The lung was adhered to the chest wall at its apex, and by its posterior and under surfaces. When these parts were separated, the points of adhesion presented a white appearance from inflammatory lymph. The lung tissue in the neighborhood of the pleuritic adhesion presented the dark-red appearance of pneumonic consolidation. There were extensive pleuritic adhesions on the left side, but no effusion of fluid.

CASE 2.

P. H.; aged thirty years; born in Norway; admitted to the U. S. Marine Hospital, port of New York, August 8, 1888, and died September 29, 1888.

History.—On being admitted he complained of cough, dyspnœa, and pain in his side. The diagnosis of pleurisy with effusion was made. He gradually grew weaker and had several hemorrhages from the lungs. Had a severe chill followed by high temperature and the diagnosis of empyema was made on August 8. He again had several hemorrhages and became very weak and died on September 29, 1888.

Necropsy (twenty-nine hours after death).—*Rigor mortis* slight. Heart displaced to right. Left lung compressed and pleural cavity filled with pus. Heart muscle flabby, valves normal. Right lung adherent to parietes, and compressed by heart. All lung tissue filled with tubercles; liver enlarged and fatty; intestines inflated; stomach empty; right kidney large, cortex fatty; left kidney same; spleen enlarged; brain not examined.

CASE 3.

G. C. (colored); age, twenty-four years; nativity, Virginia; admitted to the marine ward of St. Vincent's Hospital, Norfolk, Va., December 24, 1888; died January 24, 1889.

History.—This patient came in with considerable effusion in pleural cavity, and was twice tapped; on both occasions about a liter of purulent fluid was drawn off. Patient complained of the dyspnoea caused by the pressure of the fluid in the pleural cavity on the lungs; this was relieved by the tapping, but as the cavity would again fill up the dyspnoea returned. The temperature ranged about normal throughout, the patient's strength gradually wasting away, and he finally died of exhaustion.

Necropsy (fifteen hours after death).—*Rigor mortis* well marked; body emaciated. Lungs were bound down by old pleuritic adhesions; a large amount of serous fluid was found in the chest cavity; on the right side the fluid was mixed with pus and shreds of partially organized lymph; the lower portion of the right lung was covered with a deposit of lymph and creamy pus. There was a passage extending from the pleural cavity down through the diaphragm to the right lobe of the liver. This cavity was about 12 centimeters in diameter and 5 centimeters in depth; the sides and bottoms of this cavity were covered with a layer of pus. The liver tissue was hardened and whitened for a distance of 5 centimeters around the margin of the cavity. The cavity did not communicate with the peritoneal sac, adhesions having taken place between the liver and the diaphragm. Lungs were congested and tubercular deposits were found scattered throughout both lungs. An old ununited fracture of the seventh rib (right side) was found at the junction of the costal cartilage with the bone; this was probably the cause of the pleurisy. Heart normal; small amount of fluid in pericardium. Intestines were distended with gas and were matted together by a ring of inflammatory lymph.

ACUTE DYSPEPSIA.

J. B.W.; aged sixty-three years; native of Maine; admitted to the U. S. Marine Hospital at Boston, Mass., November 1, 1888; died December 25.

History.—Had been in hospital before with diagnosis of dyspepsia. Three weeks before admission had chills once a week for two or three weeks, followed by fever and sweats. There was tenderness over the region of the liver and tendency to constipation, with light-colored stools. After admission had frequent attacks of indigestion, always attended with jaundice. During one of these attacks he died.

Necropsy.—*Rigor mortis* well marked; considerable emaciation; skin yellow; some lymph effused on peritoneum about the liver; liver enlarged, beginning cirrhosis; weight 2,100 grams. Hypostatic congestion of both lungs; weight of right lung 820 grams; left, 450 grams. Weight of heart, 330 grams.

COLITIS.

CASE 1.

T. H.; aged forty-one years; native of New Brunswick; admitted to the U. S. Marine Hospital at Boston, Mass., August 21, 1888; died August 26.

History.—On admission the patient was in the last stage of colitis, following a severe attack of "African fever," contracted at Zanzibar four or five months before. He was extremely emaciated; could not speak above a whisper; bowels moving almost constantly; pulse weak and thready and temperature subnormal.

Necropsy (fourteen hours after death).—Body emaciated to the last degree. Small intestines from upper part of jejunum to the caecum highly injected on the outside; internally mucous membrane congested and inflamed, but no ulceration was detected. The mucous membrane of the colon throughout contained numerous points of ulcera-

tion and cicatrices of previous ulcers, variable in shape and size; some circular, some oval; from one-half to one centimeter in diameter; none very deep, and most numerous in cæcum. Liver weighed 1,075 grams and was peculiar. It had several irregular fissures in both lobes, but a notable one on the upper surface of the right lobe, dividing it into two equal parts. A large cicatrix was seen about the center of the upper surface of the left lobe, and several smaller ones in both lobes. One large abscess and four small ones on the right lobe, all containing a cheesy material except one, which contained normal pus. On section several abscesses and cicatrices were found in the interior. Spleen weighed 314 grams; enlarged and more friable than normal. Kidneys: Right weighed 183 grams; left, 193 grams; both enlarged; pelvis congested and signs of fatty degeneration evident. Thoracic viscera not examined.

CASE 2.

T. F. (colored), aged forty-three years; native of Alabama; was admitted to the U. S. Marine Hospital, Memphis, Tenn., October 18, 1888.

History.—Has had a chill every other day for a week, accompanied by frequent stools. The chills were checked by quinine and the stools became less frequent. The stools were very offensive, containing mucus, blood, and what seemed to be shreds of mucous membrane. October 20 and 21 he was delirious, with cold extremities; on the 21st he was almost pulseless; stools very frequent with a cadaveric odor; he died at 11 p. m., October 21.

Necropsy.—*Rigor mortis* well marked; no scars on body; body emaciated; lungs normal; so also heart; liver showed on its surface many white spots resembling in color an *ante-mortem* heart clot. These were caused by infarctions due to emboli; the colon on its mucous surface was black and sloughing, its walls much thickened; the mesenteric glands were much enlarged.

PERFORATING ULCER DUODENUM.

T. K.; aged thirty-eight years; nativity, Ireland; admitted to the marine ward, St. Vincent's Hospital, Portland, Oregon, Sunday, January 27, 1889; died January 29, 1889.

History.—Illness dated from Sunday morning, when he had severe cramps in abdomen and obstinate constipation; vomited repeatedly everything taken internally. There was no history of anything more than dyspeptic trouble, except a case of lead colic a year before. After admission he was greatly depressed, almost pulseless; abdomen swollen and painful; vomited several times a reddish brown liquid, apparently mostly blood; this condition lasted until the evening of his death, when, the attendant states, he was seized with a fit of vomiting, fell out of bed, and died in ten minutes.

Necropsy (fifteen hours after death).—Body well nourished; *rigor* moderate; bloody discharge from nose; cyanosis posterior aspect of trunk; abdomen somewhat tense and prominent. Thorax: Right lung congested, small and shriveled from old pleuritic binding down; left lung highly engorged with blood and bulged forward prominently. Heart normal and found in diastole. Abdomen, general diffuse peritonitis, particularly marked in pelvic cavity. There was much yellowish-white inflammatory lymph distributed over the intestines, binding some coils feebly together. There were about 500 cubic centimeters yellowish fluid, mixed with some of the reddish-brown material like that vomited, in the peritoneal cavity; the intestines in spots were highly inflamed and were much distended with gas. On the anterior wall of duodenum, about .3 centimeters (one-eighth inch) from the pyloric orifice, was a small round perforation large enough to admit an ordinary lead pencil. The stomach was opened along greater curvature, and the incision continued so as to lay open duodenum; upon the interior view thus obtained, the ulcer appeared the size of a 5-cent nickel, the upper edge encroaching upon the pylorus; through the peritoneal coat the opening was smaller, as already said. The gastric mucous membrane was bright red and considerably inflamed, vessels enlarged, etc. The other organs appeared normal.

ENTERITIS.

W. C.; aged twenty-five years; nativity, England; admitted to the marine ward of St. Vincent's Hospital, Norfolk, Va., December 23, 1888; died January 1, 1889.

History.—Patient was very much exhausted on admission, had frequent discharges of a thin watery character; these would be checked by treatment temporarily, but would again recur. About three days before his death his stomach refused to retain anything, and rectal feeding was tried, but without avail, and he died of exhaustion.

Necropsy (thirty hours after death).—*Rigor mortis* well marked; body somewhat emaciated. Lungs, old pleuritic adhesions bound down both lungs extensively; bronchial tubes contained small amount of frothy mucus; heart was slightly larger than usual; stomach, liver, and other viscera were normal, except the small intestines, which were congested and contained a yellowish fluid mixed with mucus. The mucous membrane was softened and gave evidence of inflammation; at the time of the examination the small intestines had assumed a greenish hue.

STRANGULATED HERNIA.

CASE 1.

E. G.; aged twenty-six years; nativity, South Carolina; was admitted to the marine ward of city hospital, Charleston, S. C., April 4, 1889, died April 5, 1889.

History.—On admission he was suffering from a strangulated hernia due to an injury, the distal end of a broken car striking him forcibly in the groin and left scrotum. He states that he felt no descent of the gut at the time of injury, but on the third day after he began to vomit foul-smelling fluid, and his abdomen commenced to swell and pain him. No movement of the bowels since injury. On examining the injured scrotum, now six days since it happened, there was noticed a tension about the external ring, and, under chloroform, the gangrenous tissue was incised, and the finger detected a knuckle of small intestine, incarcerated and gangrenous. The adhesions and obstructions were freely divided, and several feet of the bowel brought into view; the gangrenous portion, about 15 centimeters in length, was excised, and a primary enterorrhaphy done. After the operation, which occupied forty-five minutes, there was some shock, combatted with stimulants and warmth. He rallied for some hours, but succumbed at the sixth hour after operation.

Necropsy (ten hours after death).—Abdomen swollen; operation wound clean; contents of cavity showed recent and extensive peritonitis; the line of suture in the gut absolutely perfect; a layer of plastic material covered in the lines of suture, and the fluid contents were passed from side to side through the gut without the least leakage of fluid or gas.

CASE 2.

J. P. M.; aged seventy years; nativity, Louisiana; admitted to the U. S. Marine Hospital, New Orleans, La., November 2, 1888; died November 9, 1888.

History.—A few days before his admission to hospital his hernia (oblique inginal) of several years' standing became, as was thought, strangulated, and it was out twenty hours before his doctor could reduce it, and since its reduction he had no passage from bowels, but had pain in abdomen, vomiting, and (being an old sufferer from asthma) great difficulty in breathing. When admitted he was very weak; temperature 35°, pulse 100; he had pain in abdomen over seat of hernia, respiration quick and labored, vomiting violent and frequent, but not stercoraceous in character. An enema of 2 cubic centimeters glycerine caused a small passage of hard feces. Spts. æth. comp. relieved his breathing, and carbolic acid and tinct. iodine, in drop doses controlled the vomiting. Poultices over abdomen, opium to control pain, constituted the line of treatment, but failed to do any good. During the last

few days of life the chief symptoms were frequent stools of bad odor, high fever, vomiting, and dyspnœa. His condition and age forbade any operative measures, even if there had been any positive indications for opening the abdomen.

Necropsy (six hours after death).—External appearances, a tall, spare man, showing signs of emaciation; abdomen slightly protuberant. No *rigor mortis* present. On opening thoracic cavity the lungs collapsed but slightly. A few old pleuritic adhesions were found on both sides. The lungs were emphysematous throughout; but this condition was specially well marked along the free borders; posteriorly there was considerable hypostatic congestion, and one or two points of commencing pneumonic consolidation. Pericardium covering the roots of the aorta showed several red superficial ulcerations, which evidently had been the seat of hemorrhage, as the sac contained about 25 cubic centimeters of fluid and serum clotted blood. Heart normal in size: slight signs of fatty degeneration; ventricles filled with blood and clots, several of the latter being white in color. Vegetations were found on both the mitral and tricuspid valves, more numerous on the former. Aortic valves normal; aorta normal; right auricle filled with clots. Abdominal cavity: Peritoneum congested, cloudy, and in places covered with inflammatory exudates. The cavity contained about 100 cubic centimeters of puss. At the lower part of the abdomen, on the right side, there was found a firm band of adhesions extending from about the position of the internal abdominal ring backwards and inwards towards the posterior part of the cavity. Beneath this band several loops of intestines had become strangulated. These loops were black in color, gangrenous, and so soft as to tear with the greatest ease. There was no hernia. Large intestines: The mucous membrane was the seat of extensive dysenteric ulceration, many of the ulcers involving the muscular coats, and a few extending down to the peritoneum. Kidneys normal. Spleen rather small and atrophied, but otherwise normal. Liver normal. Suprarenal capsules normal; stomach and pancreas normal. Brain not examined.

HEPATITIS.

Ecchinococci.

W. P.; aged fifty-five years; born in Sweden; admitted to the U. S. Marine Hospital, Chicago, Ill., October 1, 1888; died October 7, 1888.

History.—Patient stated that he had been shipwrecked six weeks ago, near Detroit, Mich., and was exposed to very inclement weather for four days before he was rescued. He was picked up and taken to Buffalo where he was sick for six days from a severe cold. He recovered and shipped to Chicago. He reached here about seven days after shipping, at which time he began to have chills and fever, and diarrhœa, which continued until he was admitted to the hospital. When admitted, he was very much jaundiced, and had intense soreness over right side, about the lower edge of the liver. Bowels very much distended with gas; tongue coated yellow, but moist; heart action very slow; breathing rapid and superficial; skin clammy and yellow. Complete loss of appetite. October 5, the hypochondriac region, between the ninth and tenth ribs, was aspirated, and 500 cubic centimeters of bile-colored fluid was drawn off. The fluid was found to be almost pure bile, naturally leading to the conclusion that the gall-bladder was distended and had been aspirated. The patient grew worse rapidly, and died at half past 7 o'clock p. m., October 7, 1888.

Necropsy (fourteen hours after death).—*Rigor mortis* well marked. Body fairly well nourished; skin very much jaundiced. The abdominal cavity contained 4,000 cubic centimeters of amber-colored fluid, which resembled bile. The viscera were bound together by recent lymph formations and very much congested. Stomach and large intestines distended with gas. Liver inflamed and somewhat enlarged, and weighed 2,160 grams. The gall-bladder was found ruptured on the under surface. The walls of the gall-bladder contained five small cysts, which contained a dark grumous fluid, resembling thickened bile. One of the cysts had ruptured, establishing an opening

into the peritoneal cavity, which poured out great quantities of bile into the abdominal cavity. A pocket had formed just beneath the lower border of the liver, by means of the agglutination of the layers of the peritoneum and walls of the intestines, into which the bile from the gall-bladder poured. The ductus-communis-choledicus was closed. The intestines were stained bile-colored. Each kidney weighed 170 grams. Lungs normal. Left side of heart contained a large *ante-mortem* clot. Brain not examined.

[NOTE.—The fluid found in the abdominal cavity was largely constituted of bile. Surgeon Austin found on microscopical examination that the cysts of the gall-bladder contained echinococci. No similar case can be found on record at the hospital.]

CIRRHOSIS OF LIVER.

CASE 1.

M. H.; aged thirty-seven years; nativity, Finland; admitted to the U. S. Marine Hospital, San Francisco, Cal., August 22, 1887; died September 8, 1888.

History.—The most noticeable symptom was ascites, for which he was repeatedly tapped, the last time being in August, 1888. About September 1 he had an attack of facial erysipelas, which was followed by symptoms of peritonitis on September 6, 1888.

Necropsy.—The upper surface of the intestines was covered with inflammatory lymph, which fastened the coils together, making an unbroken surface. The intestines were uniformly dark in color. The liver was larger than normal, extending 6 centimeters below the margin of the ribs; weight 2,800 grams. Its surface was brown and granular; cut with difficulty; could not be penetrated by ordinary force of the finger.

CASE 2.

W. B.; aged thirty-three years; born in Maine; admitted to the U. S. Marine Hospital, New York, March 20, 1889; suffering with hemeralopia.

History.—His vision had been failing for two months. Examination of optic disk showed well-filled, regular vessels. Admitted having had chancre twenty-five years previously; no secondary symptoms. His speech was thick, and his mental processes sluggish. No paralysis discovered, but locomotion was slightly irregular. At 3 p. m. on the 22d he had an epileptiform convulsion, and passed into a gradually deepening coma, which continued for twenty-four hours; he died at 3 a. m., March 23, 1889.

Necropsy (seven hours after death).—Body of a well-developed white male; *rigor mortis* slight; leviores on dependent portions of the body, and a masonic device tattooed in blue and red on left forearm. On removing the calvarium the veins of the dura mater were found to be greatly congested. Posteriorly the dura was attached to the calvarium about the line of the sinuses. On section the brain was found normal; it weighed 1,450 grams. The right lung was normal, with the exception of slight oedema, and was attached by old pleuritic adhesions. It weighed 770 grams. The left lung was also attached by old adhesions, and in same general condition as the right. It weighed 729 grams. The heart weighed 350 grams. The valves were normal. A small quantity of ascitic fluid escaped from the abdominal cavity when the peritoneum was opened, the quantity not exceeding 500 cubic centimeters. The liver weighed 1,410 grams; cirrhotic, presenting the granular appearance known as "hob-nailed liver." The right kidney weighed 178 grams; was congested; seemed to be affected with parenchymatous nephritis. Microscopical examination showed only interstitial inflammation. The left kidney weighed 165 grams; condition same as the right. The spleen weighed 606 grams, and was normal. The stomach showed chronic congestion of mucous membrane. The intestines and bladder were normal.

CASE 3.

J. S.; aged forty-seven years; native of Virginia; was admitted to the U. S. Marine Hospital, Port Townsend, Wash., November 14, 1888; died December 17, 1888.

History.—This patient was a cook, and had been a hard drinker for years. No œdema of lower extremities, liver area diminished, heart sounds normal, and no albumen in the urine.

Necropsy (fourteen hours after death).—Body fairly nourished. Lungs and heart in good condition. Liver smaller than normal, with interstitial connective tissue abnormally developed and the hepatic vessels dilated. The peritoneum was the seat of a chronic plastic inflammation, with organization of new tissue, and this membrane was at least one inch in thickness, the transverse colon being completely imbedded, and its caliber greatly diminished, so much so as to cause the formation of scybala which were constantly coming away for several weeks prior to death. Upon this thickened peritoneum numerous punctate hemorrhagic spots were dotted, which gave the contained effusion a sanguineous color, a large quantity of which had been withdrawn by tapping, without any special benefit to the patient, except to relieve the pressure upon the lungs and assist respiration. No history of any previous sickness could be obtained from this patient, although an undoubted peritonitis had occurred at some time with circumscribed inflammations following. The spleen was deeply congested, and kidneys somewhat so, but otherwise normal.

CASE 4.

J. B.; aged thirty-two years; nativity, New York; admitted to the U. S. Marine Hospital, San Francisco, Cal., March 1, 1888; died August 3, 1888.

Necropsy.—The body was emaciated. The wall of the abdomen in the median line presented marks of numerous tapplings. Upon opening the abdominal cavity a large quantity of straw-colored fluid escaped. The transverse and descending portions of the colon were distended with feces, apparently caused by pressure on the sigmoid flexure by the enlarged spleen. The weight of the spleen was 800 grams; its size 25 by 15 centimeters; its capsule was much thickened. There was a great increase of fibrous tissue, so that a knife passed through it with difficulty. The color of its substance was reddish brown. The liver was very small, its weight 1,200 grams; its substance hard and fibrous; its color much like that of the spleen. The left pleural cavity contained a large quantity of serous fluid, the lung on this side being compressed to a small size. The right lung was normal in appearance. The heart was small, otherwise normal.

SOFTENING OF BRAIN (WHITE)—TUBERCLE OF LUNGS—CIRRHOSIS OF LIVER.

W. C.; aged thirty-four years; nativity, Rhode Island; admitted to the U. S. Marine Hospital, San Francisco, Cal., September 6, 1888; died September 18, 1888.

Necropsy (fourteen hours after death).—Rigor pronounced. Face and head dusky, ecchymoses on chest, flanks, and lower abdomen. Abdomen somewhat distended. Abdomen: On opening the cavity the stomach and large intestines were found full of gas, the gut contained a few small scybala. The whole canal was of a dusky, dirty blue color, from capillary venous congestion and stasis apparently. The larger vessels except in omentum were not much injected. The cavity contained a small amount of serum, but no adhesive inflammation was evidenced. Kidneys presented nothing positively abnormal except a high degree of venous congestion. Spleen was about one-third enlarged and of somewhat leathery consistency; on section it seemed unusually firm and fibrous. Liver was appreciably atrophied, by no means greatly so; reddish white in color, the surface roughly nodulated; on section hard, firm, and pale; it was clearly far advanced in cirrhosis. Thorax: The heart was slightly dilated

flabby, and fatty. The organ was displaced to the right by fluid in left pleura. Left pleura was full of sero-fibrinous exudation of long standing. The lung had been compressed about its roots into a flat oval the size of an open hand, and long since carnified. About the walls of the pleura and floating in the fluid were heavy patches and flakes of gelatinous and semigelatinous fibrin. Right pleura was obliterated by thin but continuous adhesions. The lung was deeply congested, but free from disease, except a few scattered tubercles at apex and through upper lobe. Brain: There was venous congestion of meninges, not marked. At the vertex, for some 6 centimeters along either side of longitudinal sinus, the dura was adherent to cortex. There seemed to be no recent lymph or serum here. On section nothing abnormal was seen until the lateral ventricles were reached. The ventricles were all full of serum, as was the subarachnoid space at base of brain. The walls, roof, and floor of the third ventricles were softened, macerated, and even detached and floating in curdy, creamy flakes in the ventricular fluid. The pulpy condition of the whole ventricular region made a minute examination impossible.

ABSCESS OF THE LIVER.

CASE 1.

E. T.; aged twenty-four years; native of Norway; admitted to the U. S. Marine Hospital at Boston, Mass., December 5, 1888; died December 6.

History.—Patient was in a state of collapse. On examination dullness was found in the epigastric and right hypochondriac regions. Abdomen tympanitic, breathing shallow, and accelerated, but no dyspnoea; pulse weak and feeble; lips cyanosed; no history; diagnosis not decisive.

Necropsy (next morning).—*Rigor mortis* well marked; lungs small and congested; right weighed 500 grams, left 470 grams. Heart weighed 400 grams, normal. Liver weighed 3,950 grams, much enlarged and right lobe seat of an abscess containing about 1,000 grams of pus; left lobe enlarged and congested. Intestines distended with gas; otherwise normal.

CASE 2.

J. M.; aged thirty-six years; nativity, Ireland; admitted to the U. S. Marine Hospital San Francisco, Cal., August 24, 1888; died September 2, 1888.

History.—When admitted to the hospital the patient complained of having had profuse diarrhoea during the preceding month, and during the last few days prior to his entrance frequent and bloody stools. His temperature was a little above normal in the morning, and from 38.4° to 39.6° C. in the evening. The tongue was slightly coated with red tip and edges. On September 1 a swelling was noticed in the right hypochondriac region extending 8 centimeters below the margin of the ribs. An aspirator was used and 500 cubic centimeters of bloody, flocculent fluid was removed. The pain, which had been quite severe, was temporarily relieved, but seven hours later persistent vomiting came on with great pain and tympanites. Death occurred thirty-six hours later.

Necropsy.—When the abdominal cavity was opened it was found to be distended with gas. The liver was found to extend to about the distance noted above; its anterior surface was fastened to the abdominal wall by inflammatory adhesion; the right lobe contained a large cavity filled with bloody fluid and broken-down liver tissue; the quantity of this fluid was estimated to be 500 cubic centimeters; the walls of the abscess in front and behind were very thin; there was, however, no communication between it and the abdominal cavity. The surface of the intestines was covered with recent lymph and some fecal matter. The lower portion of the small intestine was congested. The cæcum and ascending colon contained many ulcers of large size, two of them communicating with the peritoneal cavity. The spleen was small. The heart and lungs were of normal appearance.

CASE 3.

J. A. M.; aged thirty years; nativity, Finland; was admitted to the U. S. Marine Hospital, Port Townsend, Wash., June 20, 1888; died November 22, 1888.

History.—On admission the patient was suffering from congestion of the spleen, which, under constitutional and local treatment, improved in due course. Later, a tumor appeared in the epigastrie region about the size of an orange with the feel of deep fluctuation. The liver area was enlarged, the stools of a whitish-clay color, and no impulse or bruit could be detected over the tumor. Re-admitted August 4, 1888, with diagnosis of abscess of liver. A deep incision evacuated about 300 cubic centimeters of reddish pus, having the appearance of broken-down liver tissue. The cavity was washed out daily with warm bichloride solution and antiseptic dressings applied. A considerable discharge of matter of the same character continued for several weeks, and the skin and superficial connective tissue about the opening became eroded to the area of twelve centimeters, leaving the muscular plane bare, without, however, destroying this tissue. A few days before death perforation of the stomach occurred and all fluids immediately re-appeared through the opening after drinking. Death occurred November 22, 1888.

Necropsy (fourteen hours after death).—The body greatly emaciated, but without the saffron hue of a cancerous cachexia, nor had there been a history of syphilis. Sternum and anterior portion of ribs sawn through and removed from above downwards in order not to disturb the attachment beneath. A circumscribed abscess cavity was located between lower end of sternum, costal cartilages, and ribs above (which were denuded of periosteum), and the left lobe of the liver beneath with its capsule and tissue sloughed away; the stomach was adherent, and the perforation about .005 in diameter, but without any indurations about the edges to be found whatever. Other organs normal.

TRAUMATIC PERITONITIS.

P. A.; aged twenty-six years; nativity, Norway; admitted to the U. S. Marine Hospital, Chicago, Ill., June 1, 1889; died June 4, 1889.

History.—During a storm the patient was caught between a swinging life-boat and the pilot-house, receiving the pressure across the abdomen and back. On admission he had tympanites, some tenderness over the abdomen, several bruises over the right lumbar region and sacrum. His expression was that of undefined suffering. His temperature was 37.4°C.; he had been vomiting; no bones were broken; his vomiting continued in spite of cracked ice, morphia, and cerium oxalate. Turpentine stupes were applied over the abdomen, and the main reliance was placed in opium. His temperature at no time rose above 38.1°C., and only reached this stage twice. Hiccough appeared on the second day after admission, and he rapidly sank.

Necropsy (nine hours after death).—*Rigor mortis* developed; the heart weighed 315 grams; the right auricle contained an *ante-mortem* clot; valves perfect. The right lung weighed 515 grams, and was considerably congested; the left lung weighed 420 grams, normal. On opening the abdomen, about 100 cubic centimeters of bloody serum was found containing flakes of bloody lymph. The lymph had matted the coils of intestines together at one place so firmly as to cause a rupture of the gut when separation was attempted. The peritoneal vessels were highly injected. The connective tissue lying back of the right kidney was filled with infiltrated bloody serum, as was also the connective tissue over the sacrum. The liver weighed 1,950 grams, and was injected; spleen weighed 165 grams, normal; weight of right kidney, 205 grams; of left, 215 grams, both normal. Bladder was empty.

ACUTE NEPHRITIS.

CASE 1.

J. R.; aged twenty-nine years; native of South Carolina; was admitted to the marine ward of City Hospital, Charleston, S. C., March 6, 1889; died March 27, 1889.

History.—Exposure and acute inflammation of the kidneys. There was general anasarca; face much bloated; nausea and vomiting of frothy fluid, rich in urea; urine scanty, loaded with albumen; specific gravity 1.008; acid reaction. The amount passed during first twenty-four hours, 1,000 cubic centimeters; urea, 10.5 grams. There was marked irritation of the vaso-motor system; the pulse full and hard; much dyspnoea and anorexia. For the immediate relief of these urgent symptoms, glonoin, in 2-drop doses of the 2 per cent. solution, was exhibited with a most happy effect, and the man rested very comfortably. Up to the 20th of March the urine improved, quantity increased to 1,300 cubic centimeters; albumen two-thirds by volume, specific gravity 1.010; urea, 11.25 grams. The circulation improved; only occasional vomiting of fluid containing urea. From this time there was retrogression; urine fell to 425 cubic centimeters; specific gravity, 1.013; solid on heat application; urea, 8 grams in twenty-four hours. Twitching and tremor of muscles; dilated pupils; diplopia, etc. Face immensely swollen; left parotid inflamed and suppurating. Convulsions were continuous from the morning of March 25, and he died comatose.

Necropsy (six hours after death).—Body immensely swollen; some ascites; legs had been tapped, and from the incisions fluid still drained. The kidneys were alone examined; were slightly enlarged; capsules adherent, and when removed leaving a granular surface of a light yellow color, except where mottled from numerous hemorrhages. Cortices very thick and anæmic, and in the right organ there was a large retention cyst encroaching upon the pyramids, which were of an anæmic, buff color. Palpation of other organs in situ gave normal results.

CASE 2.

Secondary Syphilis.

J. J.; aged forty-eight years; nativity, New York; was admitted to the U. S. Marine Hospital, Chicago, Ill., June 1, 1888; died August 10, 1888.

History.—Patient was taken ill with pain over the right kidney, April 28, 1888, which caused him to keep his bed for several days. Prior to this date the patient claims to have been in moderate health and able to perform his duties aboard ship. In the year 1863, this man claims he was injured in falling from the gaff to the deck, which was followed by a severe hemorrhage from the penis, lasting several weeks. He claimed to have had four hemorrhages from the penis at intervals of two or three years after the injury, which lasted but a few days each time, followed by complete recovery. Five days prior to his admission to the hospital, he again commenced passing blood from the penis, this attack lasting ten days. After the hemorrhage was stopped, urine contained albumen, pus corpuscles, and urate of soda for several weeks, but no casts were found. Patient suffered from pain in right lumbar region. Marked dullness over upper lobe of left lung, without cough or evening rise of temperature. There was no dropsy in any part of the body, and the patient died of inanition.

Necropsy (eighteen hours after death).—*Rigor mortis* moderate. Body greatly emaciated. Chest: Layers of pleuræ firmly adherent throughout over each lung. No fluid in pleural sac. Slight serous infiltration, left lung. Syphilitic gummous growths were found throughout both lungs. In the apex of the left lung were several hard gummata, with beginning caseous degeneration at their centers. Bronchial glands about the size of a large orange, and caseous. Heart: 100 cubic centimeters clear fluid in pericardium. *Ante mortem* clot extending from the left ventricle into the aorta, 10 centimeters long. Tricuspid valves contained thin calcareous plates. Ab-

domen: Syphilitic gummata of a bright yellow color, the size of a filbert, covered the upper surface of the liver, just beneath the capsule, to which they were attached. The center of each gumma was cheesy. The stomach contained 1,000 cubic centimeters of undigested beef-tea and milk. Stomach somewhat dilated. Spleen small and softened. Small intestines congested. Kidneys: Right kidney removed with great difficulty, being freely bound to the spinal column and posterior abdominal wall by fibrous adhesion. Weight of kidney, 1,040 grams; general contour normal; surface nodular. Four large cysts of the kidney contained 200 cubic centimeters of clear fluid. Within the pelvis of the kidney, three calculi, weighing in all 30 grams. Complete gummons and caseous degeneration of the tissue of the right kidney. Function of kidney had been entirely destroyed, probably for many months. Left kidney hypertrophied and greatly congested. Weight, 250 grams. The hemorrhage which had occurred during life, probably from the left kidney. Brain not examined.

CASE 3.

W. T.; aged forty-seven years; admitted to the U. S. Marine Hospital, Baltimore, Md., November 28, 1888, from the schooner *Thomas Blades*; died December 13, 1888.

Necropsy.—The left ventricle was hypertrophied. Recently formed pericardial adhesions bound the two layers together. The kidneys were reduced in size; hard, nodular capsules adherent, of a grayish-brown color, contained small cysts. Cortex thinned and pyramid congested. Brain œdematous.

CASE 4.

F. C.; aged forty-eight years; native of Germany; was admitted to the U. S. Marine Hospital, Port Townsend, Wash., April 3, 1889; died April 16, 1889.

History.—Upon admission, there was considerable œdema of the lower extremities, and the urine contained 10 per cent. of albumen by volume. Patient was apathetic and indifferent to his surroundings, which condition gradually merged into a comatose state. Under the administration of the infusion of digitalis, with acetate of potash, dry cups, and digitalis leaf poultices over the region of the kidneys, this condition ameliorated for a time, but recurred shortly.

Necropsy (twelve hours after death).—The lungs and heart were in fair working condition. The liver weighed 780 grams, and had a nutmeg appearance. Spleen, weight, 350 grams. Kidneys were enlarged, pale; capsules non-adherent, and rather softer than normal.

CASE 5.

Valvular disease of heart, mitral.

I. A.; aged 21 years; native of Norway; admitted to the U. S. Marine Hospital at Boston, Mass., August 22, 1888; died September 22.

History.—Patient stated that about eighteen days previous to admission, while returning from Zanzibar, he was taken with diarrhœa and swelling of the entire body, arms, face, and legs; also bleeding of gums, soreness of mouth, and looseness of teeth—symptoms of scurvy. Had few vegetables on board, but plenty of meat and vinegar. On examination, patient was found to have mitral stenosis and general dropsy, and urine contained a large amount of albumen. Five days after admission, uræmic convulsions came on, and continued in spite of treatment for thirteen hours. Patient was semi-comatose for twenty-four hours longer. A few days later, uncontrollable diarrhœa and dysentery set in, which gradually exhausted the patient.

Necropsy.—*No rigor mortis.* Body much emaciated. Lungs normal, except slight congestion and some thickening from old inflammation in left apex. Heart weighed 250 grams: *ante-mortem* clot in right ventricle extending into the pulmonary artery; mitral valves thickened along the edges with a small excrescence on one. Liver

weighed 2,095 grams, enlarged, congested, and very friable. Ileum and colon injected externally; internally, numerous small shallow ulcers were found in the colon, especially in transverse portion. Kidneys: Left weighed 185 grams, enlarged, of yellowish color, capsule easily detached. Right kidney weighed 135 grams, same appearances as preceding, but pelvis of kidney much dilated with atrophy of medullary portion, owing to damming up of urine from impaction of a calculus in the ureter about 5 centimeters below. Kidney and pelvis contained about 30 cubic centimeters of urine. No symptoms during life.

BRIGHT'S DISEASE.

CASE 1.

J. D. R.; aged sixty-one years; nativity, Maryland; admitted to the U. S. Marine Hospital at New Orleans, La., December 14, 1888; died February 1, 1889.

History.—This man had been under treatment for "Bright's disease" for several years and had been in hospital many times. During the last years of his life ascites failed to yield to internal remedies, and he had to be tapped about twice during the month until the last month of his life, when his suffering became so great (especially from dyspnoea), that paracentesis had to be performed every other day, and at each operation about 12 liters of fluid were removed.

Necropsy.—External appearances: Body was large, and although extremely emaciated showed that he had been a powerful man. There was hypostatic congestion of posterior portions of body. *Rigor mortis* was marked. Thoracic cavity: Left pleura was adherent to chest wall. Hypostatic congestion and œdema of both lungs. There was calcareous degeneration of the aorta. Abdomen: The abdominal cavity contained about 10 liters of fluid. There were evidences of peritonitis, due probably to the frequent tapping, and the intestines were glued together in places by bands of lymph. Liver: The liver was small and cirrhotic, and contained under its capsule a hard mass resembling a hæmorrhagic infarction. Kidneys: The kidneys were small, and were the granular contracted kidneys met within "Bright's disease." Bladder: The bladder walls were hypertrophied and its lumen contracted to half its normal size. Prostate gland was enlarged. Spleen weighed 1,800 grams, its tissue tough and elastic, and the capsules thickened.

CASE 2.

T. L.; aged 24 years; native of Norway; admitted to the U. S. Marine Hospital, New Orleans, La., November 18, 1888; died April 29, 1889.

History.—He was suffering at the time with an eruption upon the skin of legs, which was diagnosed as psoriasis and treated accordingly, with success. The patient gave a history of syphilis. Some time after admission œdema of the legs was noticed, and the examination of urine showed the presence of albumen in considerable quantity. The œdema extended until it became general, and the accumulation of serum in peritoneal cavity produced a marked ascitis. The patient's condition varied considerably from this time on, but always showed an increasing condition of anæmia. The average quantity of urine passed was slightly in excess of normal. Specific gravity, 1.018, and albumen always present in large quantity. The heart's action was weak, and a dicrotic wave was very perceptible. Appetite was usually poor and bowels irregular. He was put on a rigid "skimmed-milk" diet, which he bore very well, and on Basham's mixture and tincture digitalis, with occasional sweatings from Ext. Jaborandi fld., or the vapor bath. Under this line of treatment the patient improved considerably and the anasarca entirely disappeared, but the anæmia showed no improvement and the patient continued to lose strength. During the two weeks preceding the fatal termination of the case it was necessary to combat a persistent diarrhœa. The patient during this period complained of constant pain

and tenderness over abdomen. He steadily grew weaker, and died April 29, 1889, without there having been any return of the anasarca or noticeable diminution in the quantity of urine passed.

Necropsy (seven hours after death).—General appearances: Body that of a medium-sized, stoutly built man, considerably emaciated, and showing signs of general, but very slight, edema. Thorax: Surfaces of left pleura almost completely attached to each other by old organized adhesions. Right pleura slightly adherent and containing a large amount of clear serous fluid. Lungs oedematous throughout. Pericardial sac contained about 25 cubic centimeters of serous fluid. Surface of pericardium normal. Heart normal in size. Cardiac walls flabby and in a state of fatty degeneration. Both ventricles filled with red and white clots. Leaflets of mitral valve slightly thickened. Trienspid valve normal. The aorta presented two or three small atheromatous patches near its origin. Semilunar valves normal. Abdominal cavity: A large quantity of serous fluid found in peritoneal cavity. The surfaces of the peritoneum covering the liver and adjacent organs were tightly glued together by organized inflammatory adhesions. Liver was considerably enlarged and fatty. On section hepatic tissue was found congested, and the bile ducts distended with bile. Gall bladder was full of dark, thick bile. Stomach very much distended. Spleen was about six times its normal size. The capsule stripped off easily; splenic pulp was very friable and contained but little blood. Kidney: Both kidneys were found in a state of chronic parenchymatous nephritis, and were typical examples of the "large white kidney." The superficial blood vessels were enlarged and engorged with blood. The capsule was not tightly adherent. On section the whole parenchyma was found in varying conditions of fatty degeneration. The enlargement noted above involves the entire parenchyma, but is most marked in the medullary substance. The pyramids of Malpighi have been obliterated completely at certain points, being replaced by fatty degenerated tissue. The left kidney was a little larger than the right. Supra-renal capsule normal. Bladder full of urine. Brain not examined. Cause of death: Chronic parenchymatous nephritis.

CASE 3.

D. N.; aged forty-five years; nativity, Alabama; was admitted to the U. S. Marine Hospital at Mobile, Ala., on the 20th November and died December 18, 1888.

History.—Had been under continuous treatment, either at hospital or dispensary, for Bright's disease since 1884. When admitted on the 20th of November there was much puffiness of the face, edema of the lower extremities, and ascites. Labored respiration and weak, irregular heart action. Urine contained 75 per cent. albumen, scanty. Specific gravity, 1.012. No head symptoms, as pain, dizziness, etc.; no dimness or aberration of vision. Under close attention to the emunctories and a well-regulated diet, he improved rapidly, and his condition became comfortable. December 16 it was observed that the pupils were rather widely dilated, and he complained of frontal headache; could not see so distinctly. Urine, when examined, was loaded with albumen. Complained of insomnia during preceding night. December 17 he was bright and cheerful. Pupils still dilated; no headache; bowels and kidneys active; skin rather dry. December 18 at noon he was seized with a convulsion, lasting ten minutes. Regained consciousness for half an hour. It was evident that, although the kidneys were active, they were not excreting. Urine, specific gravity, 1.009. Mur. pilocarpine hypodermatically produced some perspiration, but the convulsions (nremic) now became continuous, each succeeding one leaving a deeper condition of coma. With the eighth seizure at 6 p. m. he died.

Necropsy.—Body poorly nourished and tissues infiltrated. *Rigor* and hypostasis about loins. Tongue bitten. Abdomen opened and kidneys removed. There was very little ascitic fluid, but the tissues were all flabby and infiltrated. Kidneys proved slightly larger than normal. Capsule firmly adherent and, where removed, left a distinctly granular surface, both to the eye and touch. Numerous urine sacs; over

their surfaces and in each organ an immensely dilated one containing fully 150 cubic centimeters of stale urine. Tissue grated firmly under scalpel. Cortex almost obliterated in portions not invaded by the large urine sacs. Much fat deposit about the calyces and renal pelvis. Spleen immensely hypertrophied, of the appearance and consistence of hepatic tissue. Left supra-renal body attached to capsule of spleen, and was distinctly bronzed. Liver large and friable. Heart and lungs macroscopically normal.

CASE 4.

Pulmonary œdema.

H. K.; aged fifty-three years; nativity, Germany; admitted to the U. S. Marine Hospital, Detroit, Mich., May 18, 1889; died May 31, 1889.

History.—Patient had been troubled with bronchitis a few weeks before admission, and with frequent urination for several months. On admission he complained of weakness, shortness of breath, and cough. He was obliged to urinate about every half hour during the night, less frequently by day. He passed 2,300 cubic centimeters of urine in twenty-four hours, which contained about 30 per cent. of albumen. The microscope revealed hyaline and granular casts, red and white blood corpuscles, and some epithelium. There was no œdema of body, face, or extremities. May 30 he complained of great difficulty in breathing. Examination of the throat showed the pharynx and fauces to be deeply congested. The day following the dyspnœa was rapidly growing worse, and œdema of the glottis and epiglottis was found to exist. Scarifying reduced the swelling somewhat, with little effect on the dyspnœa. This was attributed to swelling of the mucous membrane of the trachea and bronchi, and general pulmonary œdema. Oleum tigllii, pilocarpine, and hot packs gave some temporary relief, but the dyspnœa again became worse, and the patient died of asphyxia.

Necropsy (seventeen hours after death).—Body that of a large, well-developed man. *Rigor mortis* marked. Pericardium contained considerable watery fluid. Weight of heart, 485 grams; left ventricle hypertrophied; calcareous deposits on aortic valves; arch of the aorta dilated. Old pleuritic adhesions on both sides of chest. Lungs œdematous throughout; weight, 1,650 grams. Mucous membrane of trachea and bronchi were thickened and congested, spongy-like in appearance. Epiglottis thickened, and showing marks of scarification. Mucous membrane of the rima glottidis and upper part of larynx thickened; opening of larynx narrowed. Liver of a pinkish color; firm, cutting like some tough, fibrous material; weight, 2,120 grams. Spleen large, congested, and very friable; weight, 530 grams. Capsule of left kidney slightly adherent; of right very firmly so, the kidney being torn on removal. Kidneys of light pink color, and firm; only a few of the pyramids discernible, and some of these but partially. The kidneys were about normal in size, but microscopical examination showed their true granular or cirrhotic condition. The liver was also cirrhotic.

CASE 5.

Hypertrophy of heart.

W. M.; aged forty-five years; nativity, Ireland; was admitted to the U. S. Marine Hospital, port of New York, December 15, 1888.

History.—The patient had at this time general anasarca and ascites, and suffered from some degree of dyspnœa. His urine was scanty and albuminous. Death took place March 19, 1889, in consequence of gradual failure of strength and heart failure.

Necropsy (sixteen hours after death).—Old pleuritic adhesions were found on the right side of the chest; the lung tissue of this side was healthy. There was slight bronchitis of the large tubes and slight pleurisy on the left side. The left lung was healthy. The heart was hypertrophied, and weighed 555 grams. The aorta was

dilated, and on its posterior aspect had a sacculated dilatation, the tunica interna and tunica media being destroyed, and the tunica externa not more than one-half the normal thickness. In the aorta were found several patches of calcification, varying in size from 1 to 4 centimeters in their long diameters. The aortic valves were competent, but there were soft inflammatory deposits on all the cusps. The walls of the left ventricle of the heart were over 3 centimeters in thickness. The mitral valves were competent, but the auriculo-ventricular opening of this side was larger than normal. The tricuspid valves were thickened, fatty, and incompetent. The liver was large, slightly fatty, and in a state of active congestion. The left kidney weighed 216 grams, was nodular externally, and presented the condition described as "large, buffy kidney." The right kidney weighed 190 grams, and was in the same pathological condition as the other. The spleen was twice the normal size, firm, fatty, nodular, and the capsule thickened. There was a calcareous concretion in its outer and upper margin as large as a hickory nut.

CASE 6.

R. L.; aged, forty-five years; nativity, Ireland; admitted to the U. S. Marine Hospital, San Francisco, Cal., May 14, 1888; died October 29, 1888.

Necropsy (thirty-four hours after death).—The abdominal cavity was distended with serous fluid. The kidneys were enlarged, their surfaces grayish in color, and the capsules adherent. Upon section the cut surfaces were yellowish in color and quite soft. The pyramids had, many of them, disappeared from fatty change, and the cortex was much thickened. The liver was of normal size, firm in consistence, and yellowish-brown in color. It appeared to the naked eye to have undergone fatty degeneration. There were no marked pathological changes in the thorax.

CASE 7.

J. B. (colored); aged thirty years; a native of Tennessee; was admitted to the U. S. Marine Hospital, Memphis, Tenn., January 10, 1889; died February 15, 1889.

History.—Dyspnoea on slightest exertion, poor appetite, nausea, pain in back and head, swelling of feet, legs, and face; small amount of urine passed, frequent micturition. Specific gravity of urine, 1.025. Amount of urine passed in twenty-four hours, 270 cubic centimeters; it contained 2 per cent. of albumen. The small amount of sediment showed hyaline and epithelial casts, renal epithelium and free blood corpuscles. With infusion of digitalis the amount of urine passed daily increased to 600 cubic centimeters. No further increase could be obtained. Elaterium gave watery stools, which with jaborandi and packing with bottles of hot water relieved the anasarca. February 1 the amount of urine began to diminish, and on the 4th was only 180 cubic centimeters. February 14 and 15 he passed no urine at all. His bladder was empty. The abdominal and right pleural cavities were aspirated, giving temporary relief. During the last few days of his life his legs were exceedingly tender to touch. He suffered much pain when his legs were moved. Slight dullness over left chest; respiratory murmur over whole left chest. He complained of pain in his head, which was relieved by Dover's powder. Nausea relieved by hot lemonade. He was comatose during the three last days of his life.

Necropsy.—Body œdematous. One liter of fluid in abdomen, 200 cubic centimeters in right pleural cavity. Left pleural cavity obliterated by old pleurisy. Left side of heart hypertrophied, and right side dilated; valves efficient. Lungs normal but for hypostatic congestion. Hepatic cells contain fat. Cortex of both kidneys much diminished. The renal epithelial cells show fine and coarse granules and fat. Slight increase of interstitial tissue. Weight of liver, 1,910 grams; spleen, 190 grams; left kidney, 233 grams; right kidney, 210 grams; heart, 846 grams.

CASE 8.

J. B.; aged, thirty years; nativity, Germany; admitted to the U. S. Marine Hospital, San Francisco, Cal., April 2, 1889; died April 5, 1889.

History.—The symptoms of his illness during his residence in the hospital were a feeling of dryness of the mouth, thirst, vomiting, constipation, tongue dry and red, drowsiness, contracted pupils, and very full, deep respirations with forcible expirations. The urine was passed in considerable quantity. There was slight delirium, but no convulsions or œdema.

Necropsy.—When the skull was opened the dura was found somewhat thickened and opaque, the convolutions at the convexity scarcely showing through. There was an abundance of dark colored blood flowing from the cut vessels of the dura and the longitudinal sinus. The vessels of the pia were greatly distended with blood. There was some serous effusion with slight deposits of lymph beneath this membrane. The puncta of the brain substance were unusually distinct to the eye. The lungs were extensively adhered to the chest walls, but there were no indications of recent disease. The heart was of large size. The aorta and pulmonary artery contained *ante mortem* clots extending from the cavities of the heart. The liver seemed abnormally large and presented many spots of fatty degeneration. The kidneys were enlarged and rounded, the color on section indicating chronic diffuse inflammation. The cortex was quite narrow. The intestines presented marked engorgement of the blood vessels. They were distended with gas.

CASE 9.

J. W. S.; aged, fifty-two years; nativity, New Jersey; admitted to the marine ward, German Hospital, Philadelphia, Pa., October 6, 1888; died November 2, 1888.

History.—On admission he had general dropsy with marked dyspnœa. Heart and lungs were normal except that area of cardiac dullness was increased. No pain in region of kidneys. Urine scant in quantity; specific gravity 1.018; acid and about one-half albumen. No renal casts were found on repeated examinations. He failed rapidly and died November 2, 1888.

Necropsy (thirty-five hours after death).—Serous fluid was found in considerable quantity in all the serous cavities. Heart was hypertrophied; weight 600 grams. Pericardium contained 150 cubic centimeters serum. Valves normal. Liver was granular and fatty, and weighed 1,350 grams. Kidneys were fatty and contracted, and weighed 110 grams each.

PYONEPHROSIS.

A. S.; aged fifty-six years; nativity, Denmark; admitted to the U. S. Marine Hospital, San Francisco, Cal., October 10, 1888; died March 27, 1889.

History.—This patient had suffered from urethral strictures for many years, these being, probably, the origin of his physical disability. When admitted he called attention only to an opening in the thoracic wall, the location of which is given in the record of the necropsy. The opening or sinus had existed several years, but was closed at times. During his residence in hospital there was a continuous discharge from it, but small in quantity. The urine was loaded with pus and dribbled away, keeping his clothes wet and offensive. He was in the habit of passing a small catheter, thus saving the necessity of calling the attention of others to this condition. During the latter part of his illness he complained of headache, became demented, and died from general exhaustion.

Necropsy (about twelve hours after death).—*Rigor* marked. Body extremely emaciated, exhaling a fetid odor from a fistula, opening at the end of the right twelfth rib, and from several bed-sores on posterior thorax, spine, and sacrum. Pleuræ both contained rather firm adhesions posteriorly and laterally; lungs healthy, with excep-

tion to be noted further on in the case of right lung. Toward the outer side of base of right lung it was firmly adherent to diaphragm, and at this point a fistulous track opened into this border of the lung from the suppurating sinuses below the diaphragm. Heart was very small, fatty, and weak. Liver was small, and, at the same time, fatty and discolored. Of the right kidney, nothing was left but a dense fatty cicatrix. No suppurating cavity was found, but a number of long pouches, or sinuses, where pus had burrowed in different directions from the kidney as the original center. One sinus led up, as already mentioned, through the diaphragm into the lower outer border of right lung. Another upward along the side of spinal column some 5 centimeters. Another downward and outward to the inner side of superior iliac spine. In close relation with the remains of the kidney was flexure of the colon, bound down and inseparably matted together with fibrous cicatrix of the kidney, and the walls of the sinus leading upward to the lung. It appeared highly probable that a perforation had occurred into the latter sinus; it could not be absolutely demonstrated, or at least was not. The three sinuses opened externally by the fistula already described. The left kidney was larger than normal. On section it appeared congested, and the pelvis was full of urine, but not distended. The cortex was tolerably fatty. The brain was examined. Some adhesions were found between the membranes at the vertex, and also considerable plastic exudation. The membranes generally were œdematous, and the ventricles tolerably full of serum. There was slight venous congestion of membranes generally.

ORGANIC STRICTURE OF URETHRA.

CASE I.

Infiltration of urine.

J. M.; aged thirty-five years; nativity, England; admitted to the U. S. Marine Hospital, Chicago, Ill., May 29, 1889; died June 15, 1889.

History.—The patient stated, on admission, that he had fallen into the hold of a vessel, and complained of pain in the left thigh. Nothing but a slight bruise could be discovered here, however. He complained of a difficulty in passing urine, and it was found that nothing but a filiform bougie could be passed into the bladder, and then only when the point of the bougie was made spiral shape. This was left in a few hours in the hope that a larger sound might be then passed, but this failed. Finally the small bougie belonging to Holt's dilator was introduced, the dilator attached, and gentle pressure made. It passed two strictures, but at a third seemed to meet an impassable barrier. It was thought best not to force it, and the instrument was withdrawn. A No. 1 bougie was then passed easily after coiling its point, and was followed by Nos. 2, 3, 4, and 5, all readily passing into the bladder. The patient was then put to bed, and his urine passed freely, but the following day he complained of some pain about the perineum. A slight swelling appeared, which extended into the buttocks, and it was evident the urine had infiltrated. He was placed under ether, and three incisions made into the perineum and buttocks to allow of free drainage. A bichloride poultice was applied, and renewed every half hour. A marked jaundice appeared, which was permanent. He was stimulated with whisky and carbonate of ammonia. The infiltration did not lessen, and he was placed on the table again and the perineal incision extended into the urethra. A grooved director was introduced through this wound into the bladder, and on it was passed a No. 10 silver catheter. This was fastened with tapes, and an antiseptic pad applied. He was unable to regain his strength, although he drank several bowls of milk daily, and he died June 15, 1889.

Necropsy (eight hours after death).—*Rigor mortis* very marked. The heart weighed 350 grams, and contained an *ante-mortem* clot in either auricle. The right lung weighed 390 grams; the left lung, 360 grams; hypostatic congestion of both at bases

and posterior portions. The liver weighed 1,920 grams, and was of nutmeg variety. The spleen weighed 100 grams, and was normal. The right kidney weighed 150 grams; the left, 195 grams; both slightly fatty. The pancreas weighed 120 grams; normal. The intestines were normal. There was a superficial dark slough on the right buttock, and the dark color had begun to show under the lower portion of the pelvic peritoneum. The urethra was slit up, showing three very hard and dense strictures; one about an inch from the meatus; a second in the spongy portion; and the third at the junction of the bulbous and membranous portions. There was no false passage. The right side of the lowest stricture had given away, allowing the result above described. The bladder and rectum were uninjured.

CASE 2.

Pyæmia.

G. S.; aged twenty-nine years; nativity, Louisiana; admitted to the U. S. Marine Hospital, New Orleans, La., February 4, 1889; died March 5, 1889.

History.—When admitted the patient said that he had passed no urine for four days, and an examination showed a swelling in the hypogastric region, and that the scrotum was enlarged and tender to pressure, and in fact all the tissues of that region were infiltrated with fluid. His temperature was subnormal, 35.8°; pulse, 140; very weak; tongue heavily coated, and breath foul; a strong odor of ammonical urine pervaded his entire person. He said he had a stricture, but it had never given him much trouble until the last week. It was found impossible to pass any instrument at first, but, after giving opium freely and applying hot cloths, etc., over abdomen, a filiform was introduced into the bladder, followed by "Maisonneuve," and finally "Otis's urethrotome" was used, and the urethra dilated to 32. About 1,000 cubic centimeters of bad-smelling urine was taken away, and the patient slept well during the night. On the next day, however, he suffered considerable pain and could not pass his water. It was impossible to introduce any instrument, as all the tissues surrounding the urethra, etc., were infiltrated; so he was put under chloroform, and the urethra again dilated, and a soft rubber catheter left in. The patient's general condition improved, but the infiltrated tissues did not resume their normal condition, and an external urethrotomy was performed on the fifth day after admission. This let out considerable pus, but the patient began to fail, and in spite of stimulants, tonics, etc., succumbed to pyæmia on the twenty-eighth day after admission.

Necropsy.—Body large and well developed, but emaciated. Heart pale and flabby, valves normal; pleura on left side adherent; on the right free. Lungs congested posteriorly, and on posterior inferior portion of left lung there was a small abscess. Liver was slightly enlarged. Spleen was normal. The pelves of both kidneys contained pus; ureters also dilated with pus.

CASE 3.

Urinary abscess and pyæmia.

W. D. (colored); aged forty-nine years; a native of Tennessee; was admitted to the U. S. Marine Hospital, Memphis, Tenn., February 20, 1889; died February 26, 1889.

History.—Severe pain in his legs, back, and shoulders. He also complained of pain in the perineum about 2 centimeters in front of the anus. He had been sick two weeks when admitted. When first taken he could not urinate; a physician had to draw his urine with a catheter. There was a severe pain in his right knee-joint, which contained pus. The pain in his back and shoulders yielded to anti-rheumatic treatment, but the pain in his knee-joint would not yield. On examination it was found that he had a stricture, that an abscess had formed back of the stricture, and the whole penis was infiltrated with pus of the foulest odor. When this pus was

evacuated there was left of the penis only the glans and the urethra. The corpora cavernosa and corpus spongiosum were totally destroyed. His temperature was 39°; pulse 120, weak. His decline was constant.

Necropsy.—Body emaciated. Penis swollen at end, but the corpora cavernosa and spongiosum had disappeared. Stricture at the anterior part of the membranous portion of the urethra. Pus in left knee-joint. Abdominal organs normal, except spleen, which was enlarged.

GANGRENE OF SCROTUM.

T. McC.; aged forty-five years; native of Maine; admitted to the U. S. Marine Hospital at Boston, Mass., December 22, 1888; died December 25.

History.—Twenty-four hours before admission he fell about 15 feet from a wharf and struck on the railing of a vessel, seriously injuring the scrotum and penis. Had a constant desire but was unable to urinate. The catheter could not be passed, so the bladder was aspirated without getting any urine. External urethrotomy without a guide was then performed, after which urine was passed without difficulty. His condition improved somewhat, but gangrene of the scrotum set in, and he died on 25th with symptoms of uræmia.

Necropsy.—*Rigor mortis* well marked, and body well nourished; scrotum and urethra seat of gangrene; urethra lacerated both transversely and longitudinally for about 3 inches, extending from membranous into the bulbous portion. Bulb of penis torn across and nearly sloughed away; other organs normal, with following weights: Liver, 1,450 grams; left lung, 780 grams; right lung, 660 grams; heart, 450 grams; spleen, 130 grams; right kidney, 180 grams; and left kidney, 190 grams.

CARIES OF THE ILIUM—TUBERCULOSIS OF LUNG—CYSTIC DISEASE OF KIDNEY.

J. F.; aged twenty-four years; native of England; was admitted to the U. S. Marine Hospital at Chelsea, Mass., July 3, 1888; died March 14, 1889.

History.—Patient had been in Providence Hospital, Rhode Island, about eight months, for psoas abscess. His appearance on admission was that of a thin, slender man with sallow complexion and cachectic look. A small fluctuating tumor was situated at the junction of the middle with the outer third of Ponpart's ligament, on the right side. This was incised, evacuating a small quantity of pus, and the cavity was irrigated. The opening continued to discharge pus and occasionally small pieces of bone as long as the patient lived. The patient had one profuse hemorrhage from the lungs a few months after admission, but no cough or expectoration. The urine constantly contained albumen, and towards the last cystitis developed with retention of urine, requiring the use of the catheter. Death came from asthenia.

Necropsy.—No *rigor mortis*; body extremely emaciated. An ulcer about 2 centimeters square was observed at the external opening of the fistula; the fistula was traced back 10 or 12 centimeters, to the inner border of the crest of the ilium, to a point where the bone for an area 4 centimeters square was soft, rough, and carious, while the periosteum could be easily detached from the inflamed bone over a still greater area. On opening the chest the heart was found to be small, otherwise normal; weight, 270 grams; no plenritic adhesions; left lung weighed 410 grams; right lung 710 grams; both contained yellow tubercles, the right lung being impregnated with them; no cavities. Nothing remarkable about liver or spleen; liver weighed 1,570 grams; spleen weighed 170 grams; right kidney weighed 180 grams, was small, sacculated with adherent capsule; on section it was found occupied by six cysts containing urine and pus; the kidney contained very little normal tissue; the pulvis was filled with fatty and connective tissue; there was no communication with the ureter.

and the latter had degenerated into an impervious cord; left kidney weighed 230 grams, elongated, and somewhat sacculated in appearance; capsule adherent; medullary substance alternately white and yellow; pelvis and infundibula much dilated and contained some urine; the ureter was dilated to three or four times its original size; the bladder was found enormously distended, having a capacity of 1,500 or 2,000 cubic centimeters; walls extremely thin, gangrenous in places, and covered with a white coating of pus, mucous, and calcareous deposits. A false passage was found to the bladder, leading from the urethra.

CARIES FEMUR AND TIBIA.

P. H.; aged twenty-three years; a native of Alabama; was admitted to the U. S. Marine Hospital at Mobile, Ala., June 3, 1888, for abscess of the connective tissues of thigh, consequent upon an injury received in March preceding. Despite active measures of treatment under several different surgeons, the infiltration and suppuration of the tissues (including the femur) progressed until the knee-joint was involved. From its peculiar history, from the extreme emaciation and "night sweats," but particularly from a very slight infiltration of the left apex, it was concluded the disease was tubercular; and since the joint was and had been freely drained without improvement, it was decided to resect the joint or amputate the limb. He was readmitted October 5, 1888, for caries of femur and tibia, and an excision of the diseased joint done the same day. So extensive was the caries of the condyles, especially the outer, that their resection was done as high as possible. The vivified surface of femur then presented was hyperæmic and questionable; yet the peculiarly destitute condition of one in his position with a "peg leg" induced the taking of greater risk than ordinary, and amputation, the alternative, decided against. There was an element of danger in the original sinus, which had grooved the femur and led up into a small cavity in the external condyle. From this cavity a small sequestrum was removed, and the cavity opened up and thoroughly scraped. All suspicious bone was removed, save that portion of the condyle forming the roof and outer boundary of the cavity described, and this seemed only hyperæmic. The patella, sawn transversely, was a little carious on its under surface. The tibia had lost its articular cartilage, but the bone was not attacked. Its resection was very slight, barely sufficient to obtain a freshened surface. All infiltrated soft tissues removed. Accurate approximation was secured with twisted silver wire sutures which had been subjected to heat. The patella was freshened or pared and wired. This gave support to the joint. At first there was encouragement, primary union of soft parts to the drainage exits, and solidity of the limb. The old original sinus, external drainage exit, however, did not heal, a little pus became a free flow, and soon the new joint formation broke down. This occurred as an acute outburst. Knee became swollen and tender and hot, with darting pains. Amputation of thigh. Death from exhaustion.

Necropsy.—At the request of his friends there was no general necropsy. After the amputation the knee-joint was examined. The transverse incision was healed. There was a fistulous opening at the external condyle. Patella was found firmly united by bone and freely movable. Its under surface carious in spots. Femur was found carious (pus-infiltrated) throughout its cancellous structure. Masses of new (granulation) tissue sprang from the tibial articulation, and there was evidence of new bony formation undergoing a retro-morphosis. Retrospection would teach the inadvisability of having trusted to the restoration of the hyperæmic bone plaque of the external condyle, as well as the advisability of amputation in all such cases where the bone, its cartilages being more or less destroyed, is itself diseased, since it must be a matter of much uncertainty for the surgeon to limit the tubercular infiltration.

PSOAS ABSCESS.

W. S.; aged forty-six years; admitted to the U. S. Marine Hospital, Baltimore, Md., April 14, 1888; died August 14, 1888.

Necropsy—The bodies of the third and fourth lumbar vertebræ were carious. The psoas muscles were completely destroyed. On the right side a sinus passed along the psoas sheath to an external opening below Poupart's ligament. On the left side the psoas sheath was distended with pus. Two sinuses passed downward from this abscess, one to the hip-joint and the other to the perinæum. The common iliac vein on the left side was obliterated. This sufficiently explains the marked œdema of the left leg. General fibrinous peritonitis of recent origin existed.

CARIES OF VERTEBRÆ.

CASE 1.

J. T.; aged twenty-six years; nativity, Ireland; admitted to the U. S. Marine Hospital, Stapleton, N. Y., May 8, 1888; died August 9, 1888.

Necropsy (twelve hours after death).—*Rigor mortis* not marked. On incision an abscess cavity was found over twelfth dorsal vertebra. Right lung, adherent by old pleuritic adhesions to intercostal and diaphragmatic pleura. Left lung, adherent by strong adhesions to costal cartilages, thickening of pleura over fourth rib, near vertebral articulations; just interior to this thickening, in the substance of lung, a calcareous deposit about 2 centimeters in length by $1\frac{1}{2}$ centimeters in depth; there were several small calcareous tubercles in substance of lung. Heart, pericardium attached to costal cartilages; heart firmly contracted; hypertrophy of left ventricle. Thickening of mitral valve. Liver, enlarged; great omentum adherent to spleen. Stomach very largely dilated, filled with fecal fluid. Pyloric orifice contracted. Right kidney, enlarged; fatty degeneration of cortex. Spleen normal. Left kidney same as right. Necrosis of second, third, and fourth dorsal vertebræ.

CASE 2.

J. K. (colored); aged twenty-two years; nativity, Jamaica; admitted to the U. S. Marine Hospital, San Francisco, Cal., April 23, 1888; died October 4, 1888.

Necropsy (twenty-two hours after death).—*Rigor* slight; emaciation extraordinary. Openings for drainage of pus were seen, one in front and one in rear of upper third of thigh, and one some 10 centimeters to left of spine, midway between last rib and crest of ilium; muscles over abdomen very dark, slaty on section. The organs within the cavity appeared normal, except the kidneys, which were enlarged and somewhat yellow about the cortex, indicating fatty change. The intestine seemed as usual, except the rectal portion. This was much longer than usual, bent in the form of a sigmoid flexure; the upper loop or second angle of the flexure much sacculated, full of fetid guminous feces, and containing a fish bone, apparently, about 3 centimeters long and quite thick. The whole rectum, from the beginning of the abnormal flexure almost to the anus, was dark, thickened—almost gangrenous. There was no connection, no continuity and direct relation between this lesion and that now to be noted. The body of the fifth lumbar vertebra was nearly divided in two, caries having invaded its substance on a horizontal plane, from before backward, nearly severing the upper third from the lower two-thirds of the disk. Above and below the intervertebral substance was healthy; but a carious spot was seen, some 1 centimeter in diameter, on the front of the fourth lumbar vertebra. The pus had burrowed downward and outward, along inner side of psoas muscle, partially eating it away to near Poupart's ligament; thence it burrowed upward and backward over the iliacus muscle to a point in the back, at the spot where the opening has already been noted;



thence, singularly enough, it worked down over the crest to the outer side of ilium, and burrowed thence to the front of the thigh, passing between the mussels lying between the anterior spine of ilium and the great trochanter. It then formed a deep-seated, ramifying pouch of some size, reaching half way down the thigh, and baring the periosteum in front and to inner side of the femur. Another abscess cavity was found, reaching from just behind the neck of femur half way down the thigh, with a prolongation thence along the outer side of sciatic nerve nearly to the knee-joint. This cavity was quite large and irregular above, and through it passed the sciatic nerve dissected from its connection with adjacent parts.

NECROSIS OF RIB.—BRIGHT'S DISEASE.

C. K.; aged twenty-four years; nativity, Michigan; admitted to the U. S. Marine Hospital, Detroit, Mich., February 1, 1888; died May 4, 1889.

History.—A resection of the sixth rib was performed February 28, 1888, and about 3 inches of necrosed bone removed. The wound was dressed with listerine and bichloride of mercury solutions, and a tonic line of treatment used, but the discharge of pus continued until death, and the patient steadily lost flesh. The latter part of March, 1889, anasarca developed in the lower extremities, and dropsical effusion in the abdomen and scrotum, lasting until a few hours before death. Urine contained about 50 per cent. of albumen.

Necropsy.—No *rigor mortis*. Ecchymoses on back and nates. Five fistulous openings on the right side of spinal column, between scapula and ilium, leading to necrosed rib, but having no connection with the pleural cavity. Heart normal; organized clots in all the cavities. Left lung free, somewhat œdematous; weight, 630 grams. Right lung bound by firm adhesions to chest wall, much smaller than left; weight, 360 grams. Small pus cavities found in both kidneys; cortex broad and white; columns of Bertini thick; no reaction with iodine. Right kidney weighed 330 grams; left, 375 grams.

ULCERS OF LEGS.

P. S.; aged forty-three years; nativity, Manila; admitted to the marine ward, German Hospital, Philadelphia, Pa., October 22, 1888; died November 8, 1888.

History.—His only trouble appeared to be indolent ulcers of the legs, which were dressed antiseptically, and he was given potass. iodidi. A few days after admission he stated that he was afflicted with severe itching over his entire body, and that the ulcers were due to scratching. He was then subjected to a three days' course of unguent. sulphuris, without relief. Boracic acid, in saturated solution, was then used externally with the internal administration of liq. potass. arsenit. 0.195 ter in die. This change was made November 6. On November 7 he had a severe chill in the morning, followed by temperature of 40.5°, and pain in left inguinal region, where an enlarged, painful gland was observed below the line of Poupart's ligament. During this day he was extremely restless, with difficult and rapid respiration and feeble pulse. He refused food, and his condition was evidently serious. At 6 p. m. he commenced vomiting a greenish-yellow fluid, which was continued at intervals until his death. Tinet. digitalis rad., ammonium carbonat., whisky, lime water, and milk were administered, but he failed rapidly and died at 11.40 p. m., November 8.

Necropsy (sixteen hours after death).—Body well nourished. Heart weighed 450 grams; valves normal; a rather large chicken-fat clot occupied the left ventricle and extended some distance into the aorta. Right lung weighed 570 grams, and was slightly adherent to the diaphragm; the lower lobe was congested. Left lung weighed 500 grams, and was not diseased. Liver weighed 1,850 grams, rather granular in appearance and adherent to the diaphragm opposite to the point of attachment of right lung. Spleen and kidneys were normal. There was no evidence of phlebitis of the veins of the leg. The swelling below Poupart's ligament was an enlarged lymphatic gland, pale in color, and without evidence of inflammation. The immediate cause of death was probably the partly organized clot in the left side of the heart.

SUNSTROKE.

J. G.: aged twenty-seven years; native of New Brunswick; admitted to U. S. Marine Hospital at Boston, Mass., August 18, 1888; died August 26.

History.—On admission patient was unable to walk unassisted or to talk intelligibly. His shipmates reported that he had been exposed to the sun for a long period while at work, and had been overcome by the heat. On admission patient was delirious, restless, and talkative; temperature 40° ; pupils contracted slightly. The temperature was reduced to normal by the use of antipyrin, but would rise again when it was left off. The delirium continued, the restlessness increased, the urine had to be drawn; the pulse became rapid and weak, and the patient died from heart failure.

Necropsy.—Body well nourished; no *rigor mortis*; hypostatic congestion of ears and back. On opening the skull the membranes of the brain were found intensely congested, a large quantity of dark liquid blood escaping; brain substance normal, weight of brain 1,300 grams. Heart distended with blood, dark and fluid; weight 325 grams. Right lung weighed 270 grams; left, 320 grams; both very small. Liver weighed 1,575 grams; normal. Spleen weighed 505 grams; much enlarged. Right kidney weighed 225 grams; left, 220 grams; both normal in appearance.

FRACTURE OF SKULL.

CASE I.

N. C.; aged twenty-seven years; nativity, Russia; admitted to the U. S. Marine Hospital, San Francisco, Cal., April 11, 1889; died April 18, 1889.

History.—On April 6 this patient was struck on the top of the head by a portion of broken gaff which fell from aloft. He was unconscious from the time of receiving the injury until his death. He spoke repeatedly two or three words of his native tongue, but most of the time slept quietly under the influence of morphia in small doses. The pupils were somewhat contracted at first; there was a wound over the vertex, crucial shaped, of considerable size and exposing the bone. There were no signs of compression and an operation was not considered justifiable. The bowels were freely moved with oleum tiglii.

April 11.—As there was retention of urine an attempt was made to introduce a catheter into the bladder, but as there were several strictures of small caliber only a filiform could be passed; the strictures were then cut with a urethrotome, without causing much apparent pain, and the urine drawn through a catheter.

April 18.—There is little change in the patient's condition. There is partial paralysis of the left arm and leg. The respirations are slow.

Necropsy.—Upon removing the scalp a depressed fracture about 4 centimeters in diameter was found in the locality corresponding to the external wound, over the longitudinal sinus; from the left side of this depression there was a curvilinear fracture, extending backwards and downwards, ending at the petrous portion of the temporal bone. At the lower part of this fracture there was a slight depression of the posterior fragment. Upon removing the skull cap the dura was found ruptured on the left side, in the line of fracture, for a distance of 9 centimeters. This membrane was opaque, the convolutions of the brain not showing through; the vessels of the pia mater were turgid and there was œdema of the subarachnoid connective tissue. On the right side of the brain, in the superior frontal convolution, about 4 centimeters in front of the fissure of Rolando, there was a small mass of softened tissue, presumably disorganized blood clot: this was 1 centimeter in diameter, extending down a short distance into the white brain substance, its lower extremity being conical; this clot, perhaps, accounted for the paresis existing before death on the left side. On the left side of the brain, at a point corresponding to the lower depressed fracture, occupying what is known as the angular gyrus, there was

a circular area of softening about 4 centimeters in diameter; in this area there were two softened clots of similar size and shape to the one noted above. The softening affected the entire thickness of the cortex; was of pulpy consistence and light brown in color. The deviation of the eye which might be expected from the latter lesion was not noticed during life, possibly from the fact of the patient's being asleep a great part of the time, so that accurate observations were not made just before death.

CASE 2.

Separation of frontal suture.

C. G.; aged twenty-one years; born in Norway; was admitted to the U. S. Marine Hospital, Vineyard Haven, Mass., September 23, 1888; died September 25, two days after admission.

History.—The case was brought to the hospital in the ambulance, no history of the case being obtained till the following day, when the captain came ashore and stated that the patient had been knocked violently against the vessel rail by the boom, and immediately became unconscious, remaining so till his admission, twenty-four hours after the accident occurred. At the first examination he was found to be unconscious, breathing regular, no paralysis, slight bruise over the right eye, pupils sluggish, neither contracted or dilated, pulse 70 to 75 and irregular, not intermittent. A point of depression was decidedly apparent over the junction of the sagittal and lambdoidal sutures. Trephining at this point was decided upon, and the operation commenced. On reaching the bone it was found that the depression was confined to the external table, of long duration, and had no connection with the present trouble. A careful examination failed to reveal any other seat of fracture, and the case was set aside for the further development of such symptoms as might locate the seat of pressure if one existed, the symptoms of concussion being well marked. The case, however, rapidly became worse, and death ensued on the second day after admission, consciousness never having been regained.

Necropsy (eighteen hours after death).—*Rigor mortis* well marked. No external evidences of injury to the body, except ecchymosis over right eye and under scalp. On removing the scalp it was found that a fracture extending from the junction of the nasal and frontal bones, along the frontal suture and half way back along the sagittal suture, had occurred. Really an osseous separation, for there was no depression whatever, the bones being merely pulled apart, as it were, separated from one another by a distance, at the greatest point, of one-quarter of an inch. This separation had ruptured the longitudinal sinus, and the blood had escaped in the space between the dura mater and the skull until a clot nearly one inch thick and covering the whole of the anterior and superior portions of the anterior lobe of the brain had formed. On removing the clot which was firmly attached to the dura mater, the whole surface of the brain underlying was found to be greatly flattened and inflamed. The specimen showing the seat of fracture or separation was preserved.

CASE 3.

C. P.; aged thirty years; nativity, Sweden; admitted to the marine ward, Grace Hospital, Seattle, Wash., May 24, 1889; died same day.

History.—The patient was injured by falling through a hatchway a distance of 20 feet and striking on his head. A large bruised spot was noticed over right eye. He died in a few minutes after being admitted to the hospital.

Necropsy (twelve hours after death).—*Rigor mortis* well marked over entire body. On removing scalp the right frontal bone was found depressed nearly half an inch and the orbital plate shattered. Several lines of fracture extended upwards and backwards over the right side of the skull from the depressed portion. Another fracture extended backwards through the petrous portion of the temporal bone into the foramen magnum.

GUNSHOT WOUNDS.

CASE 1.

Of chin and neck.

W. B.: aged twenty-four years: nativity, West Virginia; admitted to the U. S. Marine Hospital, Cincinnati, Ohio, October 15, 1888, with gunshot wound of chin and throat: died October 25, 1888.

History.—The bullet entered at lower border of chin about 2 centimeters to the left of median line, and passing between the soft tissues on the under surface of chin and upper part of throat, perforated the left ala of thyroid cartilage, beyond which point the most careful efforts failed to trace it. There was no shock, and the moderate hemorrhage which occurred immediately after the shooting through the mouth and nose had ceased when patient was brought to the hospital a half hour later. He articulated distinctly, though his voice was a little hoarse. The probe was passed in through the opening in the chin for a distance of about $2\frac{1}{2}$ decimeters, when it grated a hard substance to the left of the thyroid prominence, which was thought to be the bullet. An opening made at this point with the view of extracting it showed it to be the left ala of the thyroid cartilage, which had been perforated and crushed in by the bullet. Calomel was administered and a rubber ice-bag applied to the throat. The following day he was unable to swallow, and had to be sustained by enema. Peptonized milk alternated with beef juice and brandy were given in this way every three hours. This treatment was continued to the end. His temperature, which fluctuated between 38° and 39.6° , was controlled by suppositories of quinia. He did so well up to the afternoon of October 24 that his chances for recovery appeared excellent. He complained principally of headache, "a heavy feeling" in the chest, and a pain in the back of the neck in the region of the seventh cervical vertebra, radiating thence across the upper border of the scapula to the shoulder. Percussion revealed dullness at the base of both lungs. During the afternoon of October 24, without the slightest premonitory warning an alarming hemorrhage issued through his mouth and nose, causing a loss of more than 1,000 cubic centimeters of blood. After this he spat up a little from time to time during the afternoon. At 10 o'clock that night he appeared to be rallying somewhat. A special watch was placed over him, with instructions to notify the attending surgeon at the first indication of a suspicious symptom. Styptics and everything necessary were placed in readiness. At 12.30 that night another hemorrhage came on suddenly, which terminated in death before the nurse had time to summon aid.

Necropsy (nine and a half hours after death).—Body that of a powerfully built, well-nourished man. *Rigor mortis* well marked. Back discolored by hypostatic congestion. Clotted blood adheres to the mucous membrane of both nasal cavities. A wound about 2 centimeters in circumference in lower border of chin, about 2 centimeters to the left of the median line, just above border of inferior maxilla. This wound is healed externally. A wound in neck, $2\frac{1}{2}$ centimeters to the left of the thyroid cartilage, $2\frac{1}{2}$ centimeters in length, which admits a probe for a distance of 1 decimeter (this was the opening made by the surgeon when trying to extract the bullet). A depression in lower border of inferior maxilla, about 2 centimeters to the left of median line, corresponding to entrance of bullet. Cervical glands on both sides enlarged. A perforation somewhat less than 1 centimeter in diameter through left ala of thyroid cartilage, about 2 centimeters from median line, and a corresponding perforation through posterior wall. To the left, and above perforation in ala, the thyroid cartilage is crushed in. The edges of the perforation are jagged. Trachea filled with partially clotted blood. Left false vocal cord destroyed; true vocal cord intact; a perforation through œsophagus corresponding in size to that of larynx. Behind the pharynx is a collection of about 60 cubic centimeters of partially clotted

blood mixed with pus. The vertebral artery has a crescentic-shaped perforation a little less than 1 centimeter long by half that wide across the center through its anterior surface, a little to the right, just before the artery enters the transverse process of the sixth cervical vertebra. Right side of body of this vertebra crushed. From this point a sinus sufficient in size to admit the index finger is found leading obliquely downward to the right through the soft tissues. Following this down a conical-shaped bullet, belonging to a pistol of 38 caliber, is found imbedded in the soft tissues just above and almost resting on upper border of first rib, a little less than 1 decimeter to the right of spinal column. The base of both lungs contains a small amount of blood due to gravitation; otherwise they are normal. Between œsophagus and spinal column and on posterior side of spinal column, as far down as the diaphragm, there is an extravasation of blood. Stomach contains about 250 cubic centimeters of thin blood. All other organs, including brain, normal. Cause of death, hemorrhage through perforation in vertebral artery. Almost instantaneous death seems to have been averted immediately after the shooting by a rapid formation of a blood clot, effectually plugging the wound in the artery, and it was the disintegration of this clot ten days later which allowed the escape of blood.

CASE 2.

Of liver.

J. C.; aged thirty-four years; admitted to the U. S. Marine Hospital, Baltimore, Md., from schooner *Thomas B. Shell*, November 22, 1888; died November 27, 1888.

Necropsy.—A bullet wound was found, entering $6\frac{1}{2}$ inches to the right and 1 inch below the level of the navel. It entered the abdominal cavity, perforated the large intestines about 4 inches above the ileo-cæcal valve, passed through the upper extremity of the right kidney, wounded the right border of the liver, and finally passed out of the abdominal cavity $5\frac{1}{2}$ inches to the right of the spinous processes of the lumbar vertebra. A slough was forming along the course of the wound. Extravasation of the feces had taken place, and general peritonitis existed. The spleen was soft and swollen. Both lungs were bound down by old adhesions.

FRACTURE OF RIBS.

CASE 1.

Injury to lung—Peritonitis.

J. J. O.; aged forty-eight years; born in Finland; was admitted to the U. S. Marine Hospital, Vineyard Haven, Mass., July 6, 1888; died July 15.

History.—The day before admission he fell from the masthead to the deck, sustaining a fracture of the ribs (right side) with injury to the lung, and a simple comminuted fracture of the ulna. His temperature at once shot up and ranged continuously day and night between 39° and 40° C. The second day after admission peritonitis developed, and pulmonary hæmorrhage set in. The latter was for a while controlled; but the peritonitis, notwithstanding decided medication, increased, tympanites becoming enormous. The umbilicus was obliterated. Rectal tubes were of no service, and aspiration of the intestines at different points, while it relieved for a brief period, was of no permanent benefit, the gas rapidly re-accumulating. The patient died nine days after admission from heart failure.

Necropsy (twelve hours after death).—*Rigor mortis* well marked. Abdomen greatly distended. The fracture of the ulna was examined and it was found that the olecranon process was broken into three distinct pieces. On opening the abdominal cavity marked peritonitis was observed. The intestines were enormously distended, and firmly adherent, one section with another, and to the abdominal walls and organs. The omen-

tum was gangrenous. Internally the intestines (small) showed evidences of recent ulceration. The line was quite large and clearly showed evidences of recent traumatic inflammation. There were slight adhesions of the pericardium and pleuræ. The lower portion of the right lung was considerably lacerated, and some emphysema existed.

CASE 2.

With injury to liver—Peritonitis—Pneumonia.

D. M.; aged forty-two years; nativity, Scotland; admitted to the U. S. Marine Hospital, Detroit, Mich., September 2, 1888; died September 4, 1888.

History.—He was injured on tug *H. D. Alvrerson* near Marine City, Mich., Friday, August 31, 1888, by the parting of a hawser, the end of the rope striking his right side with such force as to fracture the tenth and eleventh ribs. He was rather stupid when admitted; temperature, 40° 6 C.; pulse, 100; respiration, 40; tongue very black; did not complain of pain. There were no physical signs of pneumonia on the injured side. He was not in condition to throw any light on his case, being delirious or stupid all of the time.

Necropsy.—*Rigor mortis* slight. Body well nourished, showing marks of contusion over the right shoulder and the seat of the fractured ribs. Peritoneal cavity contained some fluid and many lymph deposits, signs of recent inflammation; also two handfuls of clotted blood behind the liver, evidently from hæmorrhage from that organ, resulting from the injury. Liver congested, weight 2,240 grams; seat of interstitial hæmorrhage showing two cuts, one over an inch long, directly in front of the fractured ribs. Right kidney enlarged, weighing 295 grams; left, but 220 grams. Right lung, normal weight, 515 grams. Left lung much enlarged, weight 1,750 grams, and almost completely hepatized, its tissue sinking in water. The pneumonia probably not due to the injury, but a coincidence, being on the opposite side.

CASE 3.

With injury to lung.

R. A.; aged sixty years; nativity, England; admitted to the U. S. Marine Hospital, Baltimore, Md., January 11, 1889; died January 30 1889.

History.—One week previous to admission patient fell and injured his side. When admitted had hicough, bloody expectoration, and pain in side increased by coughing. Unable to pass his urine; a large quantity was removed by the catheter. A rib was fractured; plaster straps were applied to chest and morphia given to relieve pain. Symptoms improved, except inability to empty the bladder, until January 16, when urine mixed with mucus and blood was voided involuntarily. The abdomen became tender and the temperature rose. These symptoms continued and grew worse until death.

Necropsy (twenty hours after death).—*Rigor mortis* present. Extravasations of blood were found in the soft parts of the lumbar region. The brain was œdematous. The left ventricle of the heart was hypertrophied. The ascending portion of the aortic arch contained three small atheromatous patches, but they were not sufficient to explain the enlargement of the left ventricle. The lungs were the seat of hypostatic congestion and œdema. The spleen was softer than normal. The kidneys were enlarged, soft, congested, friable, and streaks of pus could be seen extending from the capsule to the pelvis. Bilateral purulent pyelitis existed, and on the right side, owing to a recent obstruction in the ureter, the inflammatory products had been retained, thus causing a pyonephrosis. The bladder presented a catarrhal cystitis. The spinal cord was normal.

CASE 4.

With injury to lung.

W. W. ; aged forty-three years ; born in New York ; admitted to the U. S. Marine Hospital, Chicago, Ill., June 29, 1888 ; died July 10, 1888.

History.—The patient gave an account that he had been struck in the right side by a plank, while unloading a lumber barge, two weeks ago. A local physician was called in to see him, and applied a strip of adhesive plaster to his side. He did not apply for treatment at the hospital until two weeks after he had been injured. On admission, it was found that he had fracture of the ninth and tenth ribs, with a localized pleurisy under the seat of injury. The patient had considerable pain, and percussion over the seat of injury could not be made, as it gave the man so much pain. On auscultation, the friction sound could be easily heard. His side was strapped with adhesive plaster, which gave him great relief. He had no fever at the time of admission, nor at any other time during his treatment. He was never in bed while under treatment. His appetite was good and he only complained of pain in his side. July 10, while in the wash-room, he suddenly expired.

Necropsy (twelve hours after death).—On opening the pleura of the right side, it was found full of pus. The lower portion of the lung was compressed. The injured ribs had penetrated the pleura and lung, and an abscess had formed around the seat of injury. The pericardium was filled with pus, and an opening the size of the index finger was found in the apex of the sac, which communicated with the pleural sac. The immediate cause of death was the rupture of the contents of the pleura into the pericardium. The pericardium was very much thickened, except at the point of rupture. The valves of the heart were normal. The heart walls were very thin, and showed fatty degeneration. The left lung was normal. All the other organs normal. Body fairly well nourished.

DISLOCATION OF SPINE.

S. B. ; aged thirty-seven years ; born in Kentucky ; admitted to the Marine Hospital, Louisville, Ky., October 29, 1888, shortly after midnight.

History.—Was hurt by falling of stage plank twelve hours before. Was struck on shoulders, and thrown forcibly down in bent position. Complete paralysis of lower extremities immediately ensued. When admitted he complained of great soreness of head, neck, and shoulders, and of disagreeable tingling in upper extremities from fingers to shoulders. His own expression was that "they felt like ants were crawling up them." Symptoms of concussion of cord. Fracture of lower dorsal and upper lumbar vertebræ suspected, but no displacement could be discovered. Placed in the easiest possible attitude, and given whisky and morphine. Temperature ranged from 38°.4 to 38°.8 C. Difficult respiration set in early. Died November 1, with complete pulmonary congestion.

Necropsy (fourteen hours after death).—Whole spine removed and examined, together with the cord. There was no fracture of the vertebræ proper, but a rupture and separation in part of the intervertebral substance between the fourth and fifth and the fifth and sixth dorsal vertebræ ; a separation in part between the first and second and a total separation of the third and fourth lumbar vertebræ. There was considerable hemorrhage in the spinal canal-extra meningeal, and a few small clots within the meninges. The cord had begun to degenerate in several places, presenting a shrunken, indented look, flowing when divided, almost with the consistency of pus. The lungs were œdematous and congested throughout. Other organs healthy.

FRACTURE OF PELVIS.

J. A. S.; aged twenty-six years; nativity, Sweden; admitted to the U. S. Marine Hospital, Chicago, Ill., January 12, 1889; died January 25, 1889.

History.—The patient was a deep-water sailor, who had made a trip West with a friend to see relatives in Missouri. He was injured in a coal mine by a large rock falling upon him, fracturing the pelvis and tearing the perinæum, anus, rectum, and deep urethra. The bladder was thought to be ruptured near the neck. There was also severe contusion of the right hip joint and over the sacrum. The fracture of the pelvis was through the pubes, a little to the right of the symphysis. Patient was sent to this hospital from Missouri by train with an attendant. A bandage had been placed around his pelvis. He was admitted eight days after the injury. His urine was passing through the rectum. He was placed under ether, an examination made, and a catheter introduced through the wound in the perinæum, as it was found impossible to pass it through the urethra, which was badly torn through the deeper parts. He was firmly bandaged around the pelvis, his legs were tied together, and supported by sand-bags. After several ineffectual attempts a silver catheter was finally passed through the entire urethra January 22 and fastened in with adhesive straps. The water passed mostly through the catheter. Urine was bloody when admitted, and the patient suffered greatly with pain. The bowels were loose; tympanites, no appetite, frequent vomiting, tongue coated and sordes; frequent chills and high fever.



Specimen from the case of J. A. Samuelson; admitted to the U. S. Marine Hospital, Chicago, Ill., January 12, 1889, with a fractured pelvis. Died January 25, 1889. Photographed by Assistant Surgeon Woodward.

Necropsy (six hours after death).—*Rigor mortis* well marked. Marks of ecchymoses over right hips, buttocks, and the inside of the thighs. A large bruised spot covered the region of the sacrum-abdominal cavity; parietal layer of the peritoneum, especially that lining the pelvis, was stained black by extravasated blood underneath. No adhesion of the intestines, peritoneal fluid, or other sign of peritonitis was found. Bowels were distended with gas, but normal with the exception of injection in the sigmoid flexure. The pubis was found to be fractured on both the left and right sides of the symphysis, the horizontal and descending rami being completely broken in twain, so that the entire front of the bony pelvis was lifted out after a few incisions.

The head of the right femur had perforated the acetabulum, pushing a square piece of bone before it into the pelvic cavity. In the region of the fractures on either side were found abscesses, especially large on the left side, containing a thin offensive pus. The perineum was torn wide open from the anus forward, rupturing the urethra, just in front of the prostate. A rupture of the anus was found extending about 25 millimeters up the rectum. Heart, weight, 290 grams; clot found in left auriculo-ventricular opening, 1.5 decimeters long, extending into the aorta; a *post-mortem* clot was found in the right side, extending from the ventricle into the auricle; also an *ante-mortem* clot, the size of a walnut. Lungs were collapsed, otherwise normal; spleen normal; liver greatly congested; kidneys congested, but in other respects normal; weight of right, 185 grams; of left, 180 grams.

INCISED WOUND OF THE CHEST AND PENETRATING WOUND OF ABDOMEN.

J. O. (colored); aged twenty years; a native of Tennessee; was admitted to the U. S. Marine Hospital, Memphis, Tenn., January 19, 1889; died February 7, 1889.

History.—In an altercation with another roustabout he was twice stabbed; once in the chest, and once in the abdomen. He was also once hit with a brick on the chest. The wound in the chest was not deep. It was a stab wound, and the point of the knife had impinged on the sternum. The wound in the right side of the abdomen was deeper. The knife had cut in two the tenth rib in the axillary line prolonged. It was considered injudicious to probe the wounds, as they had been received on the 10th of January, and had partially healed. Patient complained of soreness in the chest and a slight pain in his abdomen. Pulse 76, weak, but regular; temperature, 37.5° C. Patient sleeps with eyes open and moans in his sleep. He had a distressing hiccough, for which very many remedies were tried. Aromatic spirits of ammonia in an equal amount of peppermint water was the only remedy of the many which gave permanent relief; tongue coated; appetite poor; no dullness over abdomen, but some tenderness on pressure. January 21 there was found a friction sound over the præcordial area. There was pain over the same area. Pain relieved by blister. Facies anxious. Pulse weaker.

February 5.—Temperature, 36.5°. All symptoms more unfavorable.

February 7.—Pulse, 80 and very weak; temperature, 36° C. Diarrhœa amounting to four stools daily. An hour before he died complained of general pain.

Necropsy (eight hours after death).—No *rigor mortis*; body much emaciated; wound over sternum had healed; wound in right side of abdomen still open. All tissues on the visceral side of sternum were infiltrated with bloody serum. There were 200 cubic centimeters of fluid in the left pleural cavity, which contained floculi of lymph. In a few places there were adhesions. Both lungs normal. Pericardial sac contained 75 cubic centimeters of bloody serum. The pericardium was covered with a shaggy false membrane. Valves efficient. Heart cavities empty. Liver normal, except at a point beneath the external wound, where there was a cicatrix in the peritoneal covering. The liver had been penetrated to a depth of 5 centimeters with a knife. The healing of the peritoneal covering had left a circumscribed cavity 5 centimeters deep and 2 centimeters wide, in which was a small amount of pus. The intestines in the right side of abdomen were matted together. In the abdominal cavity there was about 150 cubic centimeters of purulent fluid.

Weight of liver, 1,995 grams; lung, 305 grams; right lung, 282 grams; heart, 300 grams. Local peritonitis, general pericarditis, and left pleuritis.

FRACTURE OF THE FEMUR FOLLOWED BY PHLEGMONOUS ERYSIPELAS AND OSTEOMYELITIS.

S. R.; aged twenty-four years; native of Nova Scotia; was admitted to the U. S. Marine Hospital at Chelsea, Mass., November 17, 1888; died April 29, 1889.

History.—Patient was admitted with simple fracture of lower third of the femur, and was treated by means of Buck's extension apparatus. About two months later phlegmonous erysipelas developed, probably from the abrasions caused by the adhesive plaster. The entire limb was enormously swollen. Incisions were made, but considerable sloughing followed, with general suppuration of the cellular tissue, gradually leading to death by exhaustion.

Necropsy (sixteen hours after death).—*Rigor mortis* slight; body somewhat emaciated. Hypostatic congestion of both lungs; slight pleuritic adhesion on anterior surface of right lung; weight, 405 grams. Left lung weighed 375 grams. Heart contained *post-mortem* clots; weight, 300 grams; normal. Liver normal; weight, 2,040 grams. Spleen considerably enlarged and softened; weight, 415 grams. Kidneys slightly congested; capsules not adherent; weight of right, 150 grams; of left, 140 grams. Small amount of calculus detritus in pelvis of right. On the posterior surface of the body were four large bed-sores, and one on back of right heel, exposing the necrosed surface of the os calcis. Extensive sloughing had occurred at four points on the back; one over ninth and tenth ribs, 6 decimeters from the spine, exposing a portion of each rib, which was necrosed; a second slough exposing the spinous processes of the two last dorsal and of the first lumbar vertebrae; a third slough over the inferior angle of the scapula, bone not exposed; and a fourth slough exposing the spinous processes of all the sacral vertebrae. An abscess cavity, capacity 100 cubic centimeters, lined with sloughs, situated just below and behind the anterior superior spinous process of the right ilium, opening externally and communicating by means of a sinus with the seat of fracture. A second abscess cavity existed 3 decimeters below the former, communicating with it and with the seat of fracture. A third cavity was situated on inner aspect of the thigh just above the knee, communicating same as the preceding abscesses. Fracture was situated at junction of the middle and lower thirds of the femur, about 16 centimeters above the knee joint, beginning in front and extending backwards and upwards 6 or 8 centimeters before reaching the posterior surface of the bone. There was overlapping of about 12 centimeters, the upper fragment being in front. The ends of the fragments were rounded and softened, were bathed in pus; there was no union, and the amount of callus was very limited.

STATISTICS

UNITED STATES MARINE HOSPITAL SERVICE.



STATISTICS UNITED STATES MARINE HOSPITAL SERVICE.

TABLE I.—COMPARATIVE TABLE OF NUMBER TREATED—1868 TO 1889.

The following tabular statement will serve to illustrate the results of the reorganization of the Marine Hospital Service in 1871:

Operations of the Marine Hospital Service from July 1, 1868, to June 30, 1889.

Fiscal years.	Number of places at which relief is authorized.	Number of sick and disabled seamen furnished relief.
Prior to reorganization:		
1868	64	11, 535
1869	64	11, 356
1870	74	10, 560
After reorganization:		
1871	72	14, 256
1872	81	13, 156
1873	91	13, 529
1874	91	14, 364
1875	94	15, 009
1876	94	16, 808
1877	100	15, 175
1878	210	18, 223
1879	210	20, 922
1880	210	24, 860
1881		32, 613
1882		36, 184
1883		40, 195
1884		44, 761
1885		41, 714
1886		43, 822
1887		45, 314
1888		48, 203
1889		49, 518

TABLE II.—EXHIBIT OF OPERATIONS OF THE SERVICE DURING THE YEAR ENDED JUNE 30, 1890.

Ports.	Total number of men treated.	Patients in hospital July 1, 1888.	Admitted during the year.	Total treated in hospital.	Discharged.	Died.	Remaining in hospital June 30, 1889.	Number of days relief in hospital.	Number of seamen furnished office relief.	Number of times office relief was furnished.	Number of persons examined physically, including pilots.	Amount expended.	Tonnage-tax collected.
Total	49,518	884	12,818	43,729	12,339	475	945	373,892	35,789	5	3,424	\$164,133.89	\$477,047.20
Albany, N. Y.	3	1	2	3	1	1	1	385	58	200	38	378.87	84.84
Alexandria, Va.	59	1	1	1	1	1	1	62	22	30	1	398.10	913.86
Apalachicola, Fla.	53	1	30	31	31	1	1	816	196	481	1	1,358.00	335.75
Ashtabula, Ohio.	202	6	6	4	4	1	1	62	9	10	1	382.75	1,452.75
Astoria, Oregon.	39	2	28	30	26	4	4	1,440	1,394	1,928	172	15,981.18	20,145.72
Baltimore, Md.	1,807	28	385	413	357	18	38	12,173	76	165	5	1,202.47	229.53
Bangor, Me.	1,106	1	29	30	25	5	5	665	199	901	9	1,563.80	127.83
Barnstable, Mass.	199	1	19	19	14	1	4	401	47	122	9	733.50	14.76
Bath, Me.	66	1	1	1	1	1	1	401	14	97	1	148.90	2,009.34
Beaufort, N. C.	14	1	1	1	1	1	1	53	40	210	7	419.35	155.61
Beaufort, S. C.	7	1	5	5	5	1	1	254	11	34	1	512.40	31,453.66
Belfast, Me.	45	1	5	5	5	1	1	374	1,375	118	1	64.80	44,650.05
Bismark, Dak.	22	79	855	934	833	29	72	31,545	1,374	253	1	15.10	4.74
Boston, Mass.	2,308	79	855	934	833	29	72	217	4	4	1	221.35	28.83
Bradford, La.	4	1	10	10	8	2	2	217	1	6	6	100.00	79.02
Bridgeport, Conn.	10	1	10	10	8	2	2	217	1	6	6	100.00	16.86
Bridgeport, N. J.	1	1	1	1	1	1	1	100.00	1	6	6	100.00	6,040.23
Brownsville, Texas.	114	43	43	43	37	2	4	1,063	71	110	1	1,366.40	1,366.40
Brunswick, Ga.	1,504	18	335	353	309	10	34	8,855	1,151	1,375	118	9,626.50	9,626.50
Buffalo, N. Y.	2	2	2	2	2	2	2	72	21	824	4	64.80	64.80
Burlington, Iowa.	2	1	1	1	1	1	1	21	718	824	4	21.00	632.69
Burlington, Vt.	1	1	1	1	1	1	1	21	718	824	4	21.00	632.69
Cairo, Ill.	1,018	18	282	300	282	7	11	6,461	15	131	1	154.00	27.33
Cape Vincent, N. Y.	16	1	1	1	1	1	1	17	15	131	1	154.00	1.47
Casimir, Me.	83	16	16	16	13	3	293	293	987	1,401	39	547.50	22.95
Cedar Keys, Fla.	1,180	22	171	193	166	12	15	4,622	387	1,401	39	6,860.36	3,438.82
Charleston, S. C.	49	4	4	4	4	4	4	124	45	78	1	383.95	383.95
Chattanooga, Tenn.	4,452	60	665	725	647	29	49	26,429	3,727	4,822	125	24,308.05	24,308.05
Chicago, Ill.	1,741	22	395	417	367	23	27	9,920	1,354	1,849	15	13,463.81	13,463.81
Cincinnati, Ohio	1,314	11	301	312	294	6	12	6,646	1,002	1,444	80	5,158.96	236.16
Cleveland, Ohio.	15	6	6	6	6	6	6	160	9	11	6	564.55	564.55
Corpus Christi, Texas.	19	1	1	1	1	1	1	25	18	50	1	294.75	294.75
Crisfield, Md.	3,229	50	468	518	474	14	30	18,301	2,711	3,757	134	15,933.37	15,933.37
Detroit, Mich.	19	1	1	1	1	1	1	25	18	50	1	294.75	294.75

TABLE II.—EXHIBIT OF OPERATIONS OF THE SERVICE DURING THE YEAR ENDING JUNE 30, 1889.—Continued.

Ports.	Total number of sea-men treated.	Patients in hospital July 1, 1888.	Admitted during the year.	Total treated in hospital.	Discharged.	Died.	Remained in hospital June 30, 1889.	Number of days relief in hospital.	Number of seamen furnished office relief.	Number of persons examined physically, including pilots.	Amount expended.	Tonnage-tax collected.
Ogdensburg, N. Y.	71	—	2	2	2	—	—	36	69	248	\$354.35	\$138.96
Oswego, N. Y.	72	—	8	8	7	1	—	189	64	105	528.33	1,407.46
Pensacola, Fla.	105	2	100	102	94	1	7	2,428	3	5	3,189.75	20,163.81
Perth Amboy, N. J.	—	—	—	—	—	—	—	—	—	—	—	912.63
Petersburgh, Va.	4	37	465	562	455	13	34	13,911	4	4	6.70	—
Philadelphia, Pa.	1,652	11	218	229	213	6	10	4,958	1,150	1,437	14,545.49	41,431.94
Pittsburgh, Pa.	1,176	—	—	—	—	—	—	—	947	1,404	7,344.89	—
Plattsburgh, N. Y.	6	—	—	—	—	—	—	—	6	10	100.00	2,316.03
Plymouth, Mass.	—	—	—	—	—	—	—	—	—	—	—	19.26
Port Huron, Mich.	215	1	9	10	7	3	—	186	235	1,020	529.10	17.97
Portland, Me.	716	15	232	247	222	9	16	7,639	469	561	10,257.93	5,737.77
Portland, Oregon.	366	4	119	123	113	3	7	4,271	243	292	4,728.10	1,598.60
Port Lavaca, Texas.	2	—	—	2	2	—	—	64	—	—	384.00	—
Portsmouth, N. H.	44	2	10	12	12	—	—	286	32	40	514.50	227.10
Port Townsend, Wash.	539	15	267	302	272	7	23	7,669	237	313	7,715.48	5,000.60
Providence, R. I.	149	5	94	99	94	4	1	2,966	50	50	9,460.23	448.98
Richmond, Va.	102	7	48	55	54	—	1	1,279	47	51	1,836.19	1,125.00
Rochester, N. Y.	—	—	—	—	—	—	—	—	—	—	—	184.20
Rome, Ga.	50	—	5	5	5	—	—	212	45	56	436.95	—
Sag Harbor, N. Y.	17	16	16	16	14	—	2	385	1	15	611.00	2.34
Sag Harbor, Fla.	—	—	—	—	—	—	—	—	—	—	—	—
St. Augustine, Fla.	1,291	20	325	345	309	14	22	10,535	946	1,422	11,914.93	110.01
St. Louis, Mo.	—	—	—	—	—	—	—	—	—	—	—	—
St. Mary's, Ga.	36	5	31	36	32	—	4	1,082	—	—	1,401.00	333.38
St. Paul, Minn.	31	—	4	4	2	1	1	67	27	34	211.00	—
Salem, Mass.	32	1	27	28	27	1	—	802	4	20	1,073.35	6,169.52
San Diego, Cal.	103	3	49	52	44	2	6	1,335	51	117	1,626.73	—
Sandusky, Ohio	297	60	818	878	754	50	74	27,923	1,519	2,333	22,868.79	43,201.96
San Francisco, Cal.	161	—	48	48	37	2	9	1,017	113	704	1,604.26	—
Sault Ste. Marie, Mich.	905	16	335	351	226	3	22	8,345	554	712	10,833.47	7,175.25
Savannah, Ga.	296	3	47	50	45	1	4	1,704	246	438	2,612.38	—
Seattle, Wash.	—	—	—	—	—	—	—	—	—	—	—	—
Sheddenborough, Mass.	—	—	—	—	—	—	—	—	—	—	—	—
Shreveport, La.	85	5	54	59	51	1	4	1,189	26	71	2,576.30	181.26
Sitka, Alaska.	38	—	3	3	2	—	1	1,106	35	57	1,291.09	—
Sonoma, Cal.	6	—	—	—	—	—	—	—	6	66	66.00	1.05
Stonington, Conn.	2	—	—	—	—	—	—	—	—	4	6.00	11.52

TABLE III.—SUMMARY OF PHYSICAL EXAMINATIONS OF SEAMEN MADE BY MEDICAL OFFICERS OF THE U. S. MARINE HOSPITAL SERVICE, YEAR ENDED JUNE 30, 1889.

Summary of examinations and causes of rejection.	Total.	Pilots.	Revenue marine.	Merchant marine.	Life-Saving Service.	Light-House Service.
Summary of examinations:						
Total number examined.....	3,124	1,779	235	96	1,013	1
Number passed.....	2,981	1,727	206	87	960	1
Number rejected.....	143	52	29	9	53	.....
Causes of rejections:						
Color-blindness.....	55	48	.....	.....	7	.....
Malarial fever, intermittent.....	2	.....	1	.....	1	.....
Rheumatic fever.....	2	.....	.....	.....	2	.....
Rheumatism.....	9	.....	.....	2	7	.....
Tubercle of lungs.....	1	.....	1	.....	.....	.....
Anemia.....	1	.....	1	.....	.....	.....
Epilepsy.....	1	.....	.....	.....	1	.....
Myopia.....	8	2	4	.....	2	.....
Strabismus.....	1	1	.....	.....	.....	.....
Heart disease.....	9	1	4	.....	4	.....
Varicose veins.....	8	.....	.....	.....	8	.....
Bronchitis, chronic.....	4	.....	1	1	2	.....
Chronic pneumonic phthisis.....	4	.....	4	.....	.....	.....
Hernia.....	22	.....	5	2	15	.....
Suppuration inguinal glands.....	3	.....	2	1	.....	.....
Inflammation of bladder, acute.....	1	.....	.....	1	1	.....
Stricture of urethra, organic.....	1	.....	.....	.....	.....	.....
Phimosis.....	1	.....	1	.....	.....	.....
Varicocele.....	3	.....	3	.....	.....	.....
Ankylosis.....	1	.....	.....	.....	1	.....
Abscess of hand.....	1	.....	.....	1	.....	.....
Psoriasis.....	1	.....	.....	.....	1	.....
Not stated.....	4	.....	2	1	1	.....

TABLE IV.—STATEMENT, BY DISTRICTS, OF THE NUMBER OF PATIENTS TREATED DURING THE YEAR ENDED JUNE 30, 1889.

Districts.	Total cases.	Patients in hospital July 1, 1888.	Admitted during the year.	Total number treated in hospital.	Discharged.	Died.	Patients in hospital June 30, 1889.	Number of days hospital relief furnished.	Number of sea-men furnished office relief.
Grand total.....	49,518	881	12,818	13,729	12,339	475	915	373,892	54,097
North Atlantic.....	4,709	117	1,483	1,600	1,439	52	109	48,087	3,109
Middle Atlantic.....	5,043	122	1,538	1,660	1,474	65	121	45,681	3,383
South Atlantic.....	7,608	144	1,793	1,942	1,726	69	147	54,198	5,666
The Gulf.....	5,630	7	1,594	1,691	1,541	52	98	41,622	3,929
The Ohio.....	5,130	55	1,277	1,335	1,212	47	76	30,066	3,795
The Mississippi.....	4,428	6	1,217	1,280	1,160	45	75	28,930	3,148
The Great Lakes.....	12,910	17	2,421	2,598	2,357	76	165	76,260	10,312
The Pacific.....	3,891	100	1,440	1,540	1,354	65	121	47,932	2,351
The quarantine stations.....	179	3	80	83	76	4	3	1,116	96

TABLE V.—RATIO OF PATIENTS TREATED IN HOSPITAL IN EACH DISTRICT.

Districts.	Per cent. of total number of patients.	Districts.	Per cent. of total number of patients.
North Atlantic.....	11.65	The Mississippi.....	9.32
Middle Atlantic.....	12.09	The Great Lakes.....	18.92
South Atlantic.....	14.15	The Pacific.....	11.22
The Gulf.....	12.32	The quarantine stations.....	.61
The Ohio.....	9.72		

TABLE VI.—AVERAGE DURATION OF TREATMENT IN HOSPITAL IN EACH DISTRICT.

Districts.	Average number of days relief furnished to each patient.	Districts.	Average number of days relief furnished to each patient.
North Atlantic	30.05	The Mississippi	22.60
Middle Atlantic	26.92	The Great Lakes	29.69
South Atlantic	27.91	The Pacific	31.12
The Gulf	24.55	The quarantine stations	13.44
The Ohio	22.52		

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1889.

DISEASES.	NUMBER OF CASES.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Total treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Grand Total of all Cases	881	12,848	8,410	3,643	286	475	915	35,789	49,518
GENERAL DISEASES	390	5,810	3,677	1,789	123	216	395	15,707	21,907
LOCAL DISEASES	368	5,167	3,236	1,537	139	220	403	17,468	23,003
POISONS AND POISONED WOUNDS .....	.....	30	25	3	.....	1	1	51	81
INJURIES AND AMPUTATIONS	123	1,841	1,472	314	24	38	116	2,563	4,527

NORTH ATLANTIC.

TOTAL CASES	117	1,483	837	534	68	52	109	3,109	4,709
General Diseases	47	629	323	253	30	21	49	1,104	1,750
Cow-pox .....	.....	.....	.....	.....	.....	.....	.....	15	15
Measles .....	.....	5	5	.....	.....	.....	.....	4	9
Influenza .....	.....	.....	.....	.....	.....	.....	.....	3	3
Mumps .....	.....	4	4	.....	.....	.....	.....	3	7
Diphtheria .....	.....	5	3	2	.....	.....	.....	1	6
Simple continued fever .....	.....	7	6	1	.....	.....	.....	8	15
Febricula .....	.....	.....	.....	.....	.....	.....	.....	3	3
Enteric fever	2	23	16	2	.....	5	2	24	49
Typho-malarial fever .....	.....	4	3	.....	.....	1	.....	.....	4
Cholera, sporadic .....	.....	1	1	.....	.....	.....	.....	3	4
Dysentery	1	10	10	.....	.....	1	.....	12	23
Malarial intermittent fever	2	125	111	11	1	2	2	101	228
Malarial remittent fever	3	22	19	.....	1	4	1	9	34
Malarial cachexia	1	8	5	3	.....	1	.....	19	28
Beri-Beri .....	.....	1	.....	.....	.....	.....	1	.....	1
Erysipelas, simple .....	.....	6	6	.....	.....	.....	.....	10	16
Syphilis:									
Primary	4	40	12	31	.....	.....	1	51	95
Secondary	10	78	5	76	2	.....	5	185	273
Gonorrhœa	2	55	38	13	4	.....	2	206	263
Scurvy .....	.....	3	2	1	.....	.....	.....	1	4
Alcoholism .....	.....	9	8	.....	.....	.....	1	5	14
Delirium tremens .....	.....	1	1	.....	.....	.....	.....	1	2
Debility .....	.....	14	10	4	.....	.....	.....	64	78
Old age .....	.....	1	.....	1	.....	.....	.....	.....	1
Rhenmatic fever	5	25	20	2	1	1	6	19	49
Rheumatism	3	89	30	50	5	.....	7	250	342
Osteo-arthritis	1	5	1	4	.....	.....	1	5	11
Fibroma .....	.....	2	1	.....	.....	1	.....	2	4
Lipoma .....	.....	2	2	.....	.....	.....	.....	4	6
Myoma .....	.....	.....	.....	.....	.....	.....	.....	1	1
Angelioma .....	.....	.....	.....	.....	.....	.....	.....	1	1
Warts .....	.....	1	1	.....	.....	.....	.....	2	3

TABLE VII.—*Tabular statement, by districts, of diseases and injuries, etc.*—Continued.

NORTH ATLANTIC.

NUMBER OF CASES.

DISEASES.	Remaining under treatment from previous year.	Admitted during the year.	Discharged.				Remaining under treatment at the close of the year.	Number furnished office relief.	Total treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.	Died.			
General Diseases.									
Condyloma		1					1	3	
Sarcoma		2	1				1		2
Carcinoma		1			1				1
Epithelioma								5	5
Tubercle of lung	13	72		49	12	6	18	72	157
Scrofula		4		3	1			4	8
Purpura		2	2						2
Anæmia		1			1			8	9
Local Diseases	57	668	64	257	30	25	49	1,699	2,424
DISEASES OF THE NERVOUS SYSTEM									
Congestion	10	48	12	29	6	3	8	120	178
Hæmorrhage, cerebral		4	1	1		1	1	1	4
Anæmia of brain		1		1					1
Inflammation:									
Of membranes of brain and spinal cord								3	3
Myelitis		1		1					1
Progressive muscular atrophy	2			1			1		2
Spastic spinal paralysis		2		1	1				2
Locomotor ataxy	2	4		4	1		1	3	9
Apoplexy		2				1	1		2
Hemiplegia	3	2		1	1	1	2	2	7
Local paralysis		4	2	1			1	7	11
Anæsthesia								1	1
Spasm of muscle								2	2
Wry-neck		1		1				1	2
Paralysis agitans								1	1
Neuralgia		9	4	5				39	48
Facial		2	2					17	19
Sciatica	1	7	3	5				7	15
Vertigo								4	4
Megrim								12	12
Epilepsy		3		3				14	17
Hypochondriasis	1	2		2	1			2	5
Insanity								1	1
Melancholia		2		2					2
Dementia	1	2			2		1		3
General paralysis of the insane								3	3
DISEASES OF THE EYE									
Conjunctivitis:		10	5	4	1			39	49
Catarrhal		1	1					21	22
Purulent		1		1				3	4
Phlyctenular		1	1						1
Chronic								1	1
Granular								2	2
Pterygium								2	2
Ulcer of cornea		1	1					1	2
Iritis		2	1	1				2	4
Choroiditis		1		1					1
Atrophy of optic disc		1		1					1
Inflammation of optic nerve		1			1				1
Hæmatoma								1	1
Blepharitis		1	1					1	2
Stye								3	3
Abscess of eyelid								1	1
Ptosis								1	1
DISEASES OF THE EAR									
Inflammation of the external meatus, acute		8	3	3	1		1	21	29
Accumulation of wax		1	1				1	9	10
Inflammation of the middle ear		5	2	3				12	17
Deafness		1			1				1

TABLE VII.—*Tabular statement, by districts, of diseases and injuries, etc.*—Continued.

NORTH ATLANTIC.									
NUMBER OF CASES.									
DISEASES.	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Total treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases.									
DISEASES OF THE DIGESTIVE SYSTEM—Cont'd.									
Dyspepsia.....	2	21	4	17	.....	2	.....	150	173
Gastrodynia.....	.....	.....	.....	.....	.....	.....	.....	2	2
Pyrosis.....	.....	2	2	.....	.....	.....	.....	1	3
Vomiting.....	.....	.....	.....	.....	.....	.....	.....	1	1
Hæmorrhage of the intestines.....	.....	5	1	3	1	.....	.....	5	10
Enteritis.....	.....	1	1	.....	.....	.....	.....	9	10
Typhlitis.....	.....	1	1	.....	.....	.....	.....	2	3
Colitis.....	.....	2	1	.....	.....	1	.....	1	3
Ulcer of the intestines.....	.....	.....	.....	.....	.....	.....	.....	2	2
Intussusception.....	.....	1	1	.....	.....	.....	.....	.....	1
Hernia.....	.....	4	1	3	.....	.....	.....	52	56
Tænia solium.....	.....	2	2	.....	.....	.....	.....	1	3
Diarrhœa.....	3	31	23	8	.....	.....	3	78	112
Constipation.....	.....	1	.....	1	.....	.....	.....	25	26
Colic.....	.....	.....	.....	.....	.....	.....	.....	16	16
Abscess of the rectum.....	.....	1	1	.....	.....	.....	.....	1	2
Ulceration of the rectum.....	.....	.....	.....	.....	.....	.....	.....	1	1
Piles:	.....	.....	.....	.....	.....	.....	.....	.....	.....
Internal.....	.....	7	3	4	.....	.....	.....	13	20
External.....	.....	2	2	.....	.....	.....	.....	9	11
Prolapsus of the rectum.....	.....	.....	.....	.....	.....	.....	.....	1	1
Fistula in ano.....	1	4	5	.....	.....	.....	.....	1	6
Pruritus ani.....	.....	.....	.....	.....	.....	.....	.....	1	1
Hypertrophy of the liver.....	.....	.....	.....	.....	.....	.....	.....	1	1
Congestion of the liver.....	.....	4	4	.....	.....	.....	.....	5	9
Hepatitis.....	.....	3	1	2	.....	.....	.....	6	9
Cirrhosis of the liver.....	.....	.....	.....	.....	.....	.....	.....	1	1
Abscess of liver.....	.....	1	.....	.....	.....	1	.....	.....	1
Jaundice.....	.....	3	3	.....	.....	.....	.....	2	5
Gallstones.....	.....	.....	.....	.....	.....	.....	.....	3	3
Biliary colic.....	.....	.....	.....	.....	.....	.....	.....	1	1
Ascites.....	.....	1	.....	1	.....	.....	.....	.....	1
Peritonitis.....	.....	1	.....	.....	.....	1	.....	.....	1
Omental hernia.....	1	.....	.....	1	.....	.....	.....	.....	1
DISEASES OF THE LYMPHATIC SYSTEM.....									
Induration and enlargement of the spleen from ægæ.....	5	45	33	10	4	.....	3	71	121
Hypertrophy of lymph-glands.....	.....	3	2	.....	1	.....	.....	1	1
Inflammation of lymph-glands.....	1	18	11	5	3	.....	.....	45	64
Suppuration of lymph-glands.....	4	24	20	5	.....	.....	3	24	52
DISEASES OF THE THYROID BODY.....									
Goitre.....	1	.....	.....	.....	.....	1	.....	1	2
.....	1	.....	.....	.....	.....	1	.....	.....	2
DISEASES OF THE URINARY SYSTEM.....									
Congestion of the kidney.....	1	32	12	13	2	1	5	62	95
Acute nephritis.....	.....	3	1	1	.....	.....	1	3	6
Bright's disease.....	.....	7	.....	3	1	1	2	7	14
Abscess of kidney.....	.....	2	.....	.....	1	.....	1	1	3
Diabetes insipidus.....	.....	1	.....	1	.....	.....	.....	3	4
Hæmaturia.....	.....	3	1	1	.....	.....	1	2	5
Hemorrhage of bladder.....	.....	.....	.....	.....	.....	.....	.....	1	1
Inflammation of bladder:	.....	.....	.....	.....	.....	.....	.....	.....	.....
Acute.....	1	6	6	1	.....	.....	.....	11	18
Sub-acute.....	.....	1	1	.....	.....	.....	.....	3	4
Chronic.....	.....	7	1	6	.....	.....	.....	19	26
Irritability of bladder.....	.....	.....	.....	.....	.....	.....	.....	2	2
Retention of urine.....	.....	2	2	.....	.....	.....	.....	2	4
Incontinence of urine.....	.....	.....	.....	.....	.....	.....	.....	7	7
DISEASES OF THE GENERATIVE SYSTEM.....									
Urethritis.....	7	87	59	27	4	.....	4	156	250
Gleet.....	.....	1	.....	.....	.....	.....	1	1	2
.....	.....	3	2	1	.....	.....	.....	13	16

TABLE VII.—*Tabular statement, by districts, of diseases and injuries, etc.—Continued.*

NORTH ATLANTIC.									
NUMBER OF CASES.									
DISEASES.	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished with office relief.	Total treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases.									
DISEASES OF THE GENERATIVE SYSTEM—Continued.									
Stricture of urethra:									
Organic.....	3	19	8	11	1	2	26	48	
Spasmodic.....							2	2	
Urinary fistula.....	1		1					1	
Chronic inflammation of prostate gland.....		1			1			1	
Inflammation of glands of penis.....		1	1				2	3	
Abscess of penis.....							1	1	
Ulcer of penis.....	1	27	24	2	1	1	59	87	
Phimosis.....		3	2	1			1	4	
Paraphimosis.....		1		1				1	
Hydrocele of spermatic cord.....		2	2				1	3	
Varicocele.....		2		1	1		5	7	
Hydrocele of tunica vaginalis.....		8	2	6			10	18	
Orchitis:									
Acute.....	1	6	7				17	24	
Chronic.....	1	4	3	2			2	7	
Epididymitis.....		7	6	1			5	12	
Abscess of testicle.....							1	1	
Spermatorrhœa.....		2	1	1			7	9	
Impotence.....							2	2	
Metrorrhagia.....							1	1	
DISEASES OF THE ORGANS OF LOCOMOTION.									
Ostitis.....	4	40	18	13	2	2	9	82	
Periostitis.....	1	2	2				1	4	
Caries.....	1	5	1	3		1	5	11	
Necrosis.....		3		2			1	4	
Synovitis:	1	7	5			3	4	12	
Acute.....		6	3	3			2	8	
Chronic.....		2	1	1			7	9	
Loose cartilage.....							2	2	
Psoas abscess.....		1				1		1	
Curvature of spine.....		5		2	1	2	4	9	
Inflammation of tendons.....	1	2	1	2			1	4	
Contraction of tendons.....		1	1				1	2	
Inflamed bursa.....		2	2				9	11	
Thecal abscess.....		2	1			1	1	3	
Bunion.....		2	1		1			2	
DISEASES OF THE CONNECTIVE TISSUE.....									
Edema.....	5	36	32	6	1	2	57	98	
Inflammation.....		2	2				4	6	
Abscess.....		10	10				16	26	
	5	24	20	6	1	2	37	66	
DISEASES OF THE SKIN.....									
Erythema.....	2	96	67	21	6	1	3	243	
Urticaria.....		3	2		1		5	8	
Eczema.....							7	7	
Impetigo.....		10	7	1	2		36	46	
Pityriasis.....							6	6	
Lichen.....							2	2	
Psoriasis.....							1	1	
Herpes.....							6	6	
Zona.....	1	2	1	2			15	18	
Pemphigus.....		1	1				1	1	
Acne.....							1	3	
Sycosis.....		1		1			2	1	
Seborrhœa.....							1	1	
Chilblain.....							2	1	
Frostbite.....		2		1	1		9	12	
Ulcer.....		37	23	10	2	2	52	89	
Fissures.....							1	1	
Boil.....	1	16	15	1		1	31	48	
Carbuncle.....		3	2	1			7	10	
Gangrene.....		1				1		1	

TABLE VII.—*Tabular statement, by districts, of diseases and injuries, etc.*—Continued.

MIDDLE ATLANTIC.

DISEASES.	NUMBER OF CASES.							
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Remaining under treatment at the close of the year.	Number furnished office relief.	Total treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.	Died.		
General Diseases.								
Condyloma		2	1	1			6	8
Granulation-tumors	1					1		1
Sarcoma		2			1	1	2	4
Epithelioma		1	1				1	2
Scirrhus		1	1					1
Tubercle of lung and other organs	13	47		26	8	13	13	81
Acute miliary tuberculosis		1				1	1	2
Serofula							6	6
Anemia							4	4
Local Diseases	62	685	446	182	22	36	61	1,655
DISEASES OF THE NERVOUS SYSTEM.	14	46	16	26	5	4	9	138
Congestion, cerebral		1	1					1
Hemorrhage, cerebral		2				2		2
Inflammation:								
Of cerebral membranes	1		1					1
Of spinal cord and its membranes		1	1					1
Myelitis							5	5
Neuritis	1	1	2					2
Sclerosis		2		2			1	3
Locomotor ataxy	2	5		3	2	2	5	12
Paralysis							1	1
Hemiplegia	3	5		5		1	2	8
Paraplegia	3	4		3	1	1	2	7
Local paralysis		5		4	1			5
Lead palsy		1		1				1
Aphasia	1	1		1	1			2
Neuralgia		6	2	3			1	39
Facial		1	1					10
Sciatica	2	5	7					11
Vertigo							4	4
Migrain							1	1
Epilepsy		1				1	1	2
Chorea		2		2				2
Melancholia		3	1	1		1	4	7
Dementia	1			1				1
DISEASES OF THE EYE.	4	11	9	6			38	53
Cedema of the conjunctiva							1	1
Conjunctivitis:								
Catarrhal	3	5	6	2			16	24
Purulent		2	1	1			8	10
Chronic							1	1
Granular	1	1	1	1				2
Prerpygium		1		1			1	2
Iritis		1	1					1
Atrophy of optic disc							1	1
Neuro-retinitis		1		1				1
Night-blindness							4	4
Anaurosis							1	1
Inflammation of the lachrymal gland							1	1
Hematoma							1	1
Blepharitis							1	1
Stye							1	1
Trichiasis							1	1
DISEASES OF THE EAR.	1	7	2	5	1		16	24
Inflammation of the external meatus,								
acute		2	1	1			1	3
Chronic							1	1
Accumulation of wax							3	3
Inflammation of the middle ear	1	4	1	4			6	11
Obstruction of Eustachian tube							2	2
Tinnitus							1	1
Deafness		1			1		2	3

TABLE VII.—*Tabular statement, by districts, of diseases and injuries, etc.—Continued.*

MIDDLE ATLANTIC.

DISEASES.	NUMBER OF CASES.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief	Total treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases.									
DISEASES OF THE NOSE.....		1		1				11	12
Epistaxis.....								1	1
Inflammation.....								1	1
Nasal catarrh.....								9	9
Ozena.....		1		1					1
DISEASES OF THE CIRCULATORY SYSTEM....	4	28	2	21		5	4	37	69
Pericarditis.....		1		1					1
Endocarditis.....		1	1						1
Valvular disease:									
Aortic.....	1	2				2	1	3	6
Mitral.....	3	11		11		1	2	14	28
Tricuspid.....		1		1					1
Hypertrophy of heart.....		3		2		1		2	5
Dilatation of heart.....		2		1			1	1	3
Angina pectoris.....								4	4
Palpitation and irregular action of heart.....		2		2				7	9
Aneurism of arteries.....		3		2		1			3
Varix.....		2	1	1				6	8
DISEASES OF THE RESPIRATORY SYSTEM....	5	193	52	30	4	14	8	299	407
Laryngitis:									
Acute.....		1		1				3	4
Catarrhal.....								7	7
Ulceration of larynx.....		1				1			1
Bronchitis:									
Acute.....		36	27	6	1	1	1	141	177
Chronic.....	2	5	2	2	1	1	1	19	26
Catarrhal.....		3	2		1			45	48
Spasmodic asthma.....		4	1	2			1	16	20
Hæmoptysis.....								4	4
Pneumonia.....		17	10	1		6		8	25
Cirrhosis of lung.....								1	1
Pneumonic phthisis:									
Acute.....		14		9		1	4	13	27
Chronic.....	1	11		8		3	1	25	37
Emphysema.....								1	1
Pleurisy:									
Acute.....	2	10	10	1	1			10	22
Chronic.....								6	6
Empyema.....		1				1			1
DISEASES OF THE DIGESTIVE SYSTEM.....	9	136	105	23	4	6	7	485	630
Ulcer of the lips.....								1	1
Stomatitis.....		1	1					2	3
Ulcerative stomatitis.....								1	1
Caries of dentine and cementum.....								6	6
Abscess of dental periosteum.....								4	4
Inflammation of gums and alveoli.....		1	1					5	6
Toothache.....								1	1
Ulcer of the tongue.....								3	3
Sore throat.....		1				1		26	27
Quinsy.....		6	5	1					6
Follicular tonsillitis.....		9	8	1				24	33
Ulceration of fauces.....								1	1
Inflammation of salivary glands.....								1	1
Abscess of salivary glands.....		1	1						1
Follicular inflammation of the pharynx.....		3	7				1	13	21
Ulceration of pharynx.....								4	4
Hæmorrhage of the stomach.....								1	1
Inflammation of the stomach.....	1	15	12	3		1		21	37
Ulceration of the stomach.....								1	1
Dyspepsia.....		4	4					77	81
Gastrodynia.....								4	4
Pyrosis.....								2	2
Catarrhal inflammation of the intestines.....		12	12					13	24
Enteritis.....		4	3	1					5

TABLE VII.—*Tahular statement, by districts, of diseases and injuries, etc.—Continued.*

MIDDLE ATLANTIC.

DISEASES.	NUMBER OF CASES.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Total treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases.									
DISEASES OF THE DIGESTIVE SYSTEM—Con.									
Typhlitis		1	1						1
Colitis		1		1					1
Obstruction of the intestines.....		2	1				1		2
Hernia		7	2	1	1		3	97	104
Tania solium		2	2					7	9
Ascaris lumbricoides								1	1
Diarrhœa	1	15	12	4				65	81
Constipation		2	2					46	48
Colic								5	5
Abscess of the rectum		1	1						1
Ulceration of the rectum		3	1	2				1	4
Piles:									
Internal		5	4	1				6	11
External	1	5	3	1	1		1	23	29
Prolapsus of the rectum	1			1					1
Prolapsus of the anus		3	3					1	4
Fistula in ano		11	7	2		1	1	1	12
Congestion of the liver		4	4					2	6
Hepatitis	1	2	1		1	1		6	9
Cirrhosis of liver	1	5		4	1	1		4	10
Abscess of liver	1					1		1	1
Jaundice								3	3
Inflammation of hepatic ducts and gall-bladder		3	3					4	7
Ascites	1	1	2					1	3
Peritonitis	1	1	2					1	3
DISEASES OF THE LYMPHATIC SYSTEM.....									
Hypertrophy of the spleen	2	92	70	13	1		10	74	168
Congestion of the spleen								2	2
Inflammation of lymph-glands		58	45	8	1		4	56	114
Suppuration of lymph-glands	2	34	25	5			0	15	51
DISEASES OF THE URINARY SYSTEM									
Congestion of the kidney	5	28	6	12	4	6	5	56	89
Acute nephritis								8	8
Bright's disease		6	2	2		1	1	1	7
Abscess of kidney	4	12		7	2	4	3	6	22
Calculus in kidney		1	1						1
Diabetes insipidus		1			1				1
Hæmaturia		2	1		1				1
Inflammation of bladder:								7	9
Acute		1					1	4	5
Sub-acute								2	2
Chronic	1	2	1	2				8	11
Irritability of bladder								10	10
Retention of urine		1	1					2	3
Incontinence of urine		1		1				8	9
DISEASES OF THE GENERATIVE SYSTEM.....									
Typhlitis	8	97	79	18	1		7	265	370
Gleet								17	17
Stricture of urethra:		1		1				54	55
Organic	2	17	17	2				36	55
Spasmodic								3	3
Urinary fistula		4	1	1			2		4
Hypertrophy of prostate gland								1	1
Acute inflammation of prostate gland		1	1						1
Chronic inflammation of prostate gland								1	1
Inflammation of glands of penis								6	6
Ulcer of penis	3	29	22	6	1		3	83	115
Phimosis		9	8	1				1	10
Paraphimosis	1	7	7	1				3	11
Inflammation of spermatic cord								1	1
Varicocele		2	1				1	18	20
Hydrocele of tunica vaginalis	1	3	3	1				10	11

TABLE VII.—*Tabular statement, by districts, of diseases and injuries, etc.—Continued.*

MIDDLE ATLANTIC.

DISEASES.	NUMBER OF CASES.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Total treated in hospital and dis- pensary.
			Recovered.	Improved.	Not improved.				
Local Diseases.									
DISEASES OF THE GENERATIVE SYSTEM—Con.									
Orchitis:									
Acute	1	17	13	4			1	13	31
Chronic		1	1					10	11
Epididymitis		6	5	1				2	8
Spermatorrhœa								5	5
Impotence								1	1
DISEASES OF THE ORGANS OF LOCOMOTION..									
Hypertrophy of bone	4	23	12	10			5	20	47
Periostitis								1	1
Necrosis	1	2	3					3	6
Dropsy of joints		3	2				1		3
Synovitis:		1		1					1
Acute	1	7	2	3			3	4	12
Chronic		2	2					3	5
Ankylosis		1		1				6	7
Dislocation of articular cartilage								1	1
Curvature of spine	1	1		1			1		2
Atrophy of muscles	1	1		2					2
Inflammation of tendons		2	1	1				1	3
Inflamed bursa		1	1						1
Bursal abscess		1		1					1
Bunion		1	1					1	2
DISEASES OF THE CONNECTIVE TISSUE									
Edema	2	36	35	1			2	44	82
Inflammation								7	7
Abscess	1	6	7					12	19
	1	30	28	1			2	25	56
DISEASES OF THE SKIN									
Erythema	4	77	58	16	2	1	4	232	313
Urticaria								1	1
Eczema								2	2
Intertrigo		2	1	1				21	23
Impetigo								1	1
Rupia								1	1
Pityriasis								8	8
Lichen								1	1
Psoriasis		1	1					2	2
Herpes								1	2
Zona								6	6
Acne	1	1	2					4	6
Chilblain								5	5
Frostbite								1	1
Ulcer	1	3	4					4	8
Cicatrices	1	59	40	14	1	1	4	78	138
Boil				1				1	2
Carbuncle		5	5					52	57
Whitlow		1	1						1
Onychia		2	2					4	6
Corn								1	1
Wen								1	1
Pruritus								1	1
Itch		2	2					6	6
Phthiriasis								20	22
Malingery		1			1			2	2
Undetermined								6	7
								2	2
Poisons		3	3					7	10
Lead		2	2						2
Mercury								3	3
Alcohol		1	1					2	3
Tobacco								2	2

TABLE VII.—*Tabular statement, by districts, of diseases and injuries, etc.*—Continued.

SOUTH ATLANTIC.

DISEASES.	NUMBER OF CASES.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Total treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
TOTAL CASES	144	1,798	1,237	468	21	69	147	5,666	7,608
General Diseases.....	66	865	575	246	10	32	68	2,557	3,488
Chicken-pox.....								1	1
Measles.....								1	1
Scarlet fever.....		1	1						1
Dengue.....		1	1						1
Whooping-cough.....								1	1
Mumps.....	1	7	7	1				13	21
Diphtheria.....		1	1					5	6
Simple continued fever.....		1	1					1	2
Enteric fever.....	3	6	7			2		6	15
Typho-malarial fever.....		1	1					1	2
Yellow fever.....		4	1	3					4
Cholera, sporadic.....		2	2					1	3
Dysentery.....	4	34	29	6			3	54	92
Malarial intermittent fever.....	6	258	232	8	2	2	20	683	947
Malarial remittent fever.....	4	63	50	12		1	4	48	115
Malarial cachexia.....	4	44	35	10		1	2	85	133
Beri beri.....		1		1					1
Phagedaena.....		1		1					1
Erysipelas:									
Simple.....		10	10					9	19
Phlegmonous.....		2	1	1					2
Syphilis:									
Primary.....	2	50	17	32			3	64	116
Secondary.....	14	74	7	73		1	7	337	425
Gonorrhoea.....	4	38	23	13			6	564	606
Animal parasites, Entozoa.....	1			1					1
Effects of heat.....		2	1	1				1	3
Effects of climate.....		1		1					1
Scurvy.....								5	5
Alcoholism.....		7	6		1			6	13
Delirium tremens.....		1	1						1
Debility.....		10	3	5	1		1	64	74
Rheumatic fever.....	5	16	13	6		1	1	23	44
Rheumatism.....	7	160	119	34	3	5	6	485	652
Osteo-arthritis.....								1	1
Fibroma.....								3	3
Mixoma.....		1		1				1	2
Chondroma.....		3	2				1		3
Osteoma.....								2	2
Warts.....	1	1	1			1		6	8
Condyloma.....								1	1
Carcinoma.....		2		2				1	3
Epithelioma.....								1	1
Scirrhus.....		1					1		1
Tubercle of lung and other organs.....	10	55	2	31	2	18	12	39	104
Scrofula.....		3	1	1			1	9	12
Purpura.....		1				1			1
Anæmia.....		2		2				27	29
Diabetes mellitus.....								8	8
Local Diseases.....	64	690	479	173	11	31	60	2,781	3,535
DISEASES OF THE NERVOUS SYSTEM.....	18	33	17	8	1	6	19	169	220
Myelitis.....		1				1			1
Neuritis.....								2	2
Paralysis.....								2	2
Hemiplegia.....	1	3		1		2	1	2	6
Local paralysis.....		3		3				4	7
Spasm of muscle.....								2	2
Neuralgia.....		8	7				1	88	96
Facial.....								37	37
Sciatica.....		4	4					9	13
Vertigo.....								5	5
Megrim.....								8	8
Tetanus.....		1				1			1

TABLE VII.—*Tabular statement, by districts, of diseases and injuries, etc.*—Continued.

SOUTH ATLANTIC.

DISEASES.	NUMBER OF CASES.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Total treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases.									
DISEASES OF THE NERVOUS SYSTEM—Cont'd.									
Epilepsy	1	2		2			1	6	9
Hypochondriasis								2	2
Insanity								2	2
Mania	10	6	3	1			12		16
Melancholia	5	2	2	1		1	3		7
Dementia		3	1		1		1		3
General paralysis of the insane	1					1			1
DISEASES OF THE EYE									
Conjunctivitis:	2	13	8	6			1	66	81
Catarrhal		4	1	3				26	30
Purulent		1					1	10	11
Granular		1	1					1	2
Pterygium		1	1					3	4
Keratitis	1	2	1	2				9	12
Ulcer of cornea								1	1
Iritis		3	2	1				6	9
Inflammation of optic nerve	1	1	2						2
Cataract, lenticular								1	1
Asthenopia								1	1
Night-blindness								2	2
Hæmatoma								1	1
Stye								3	3
Chalazion								2	2
DISEASES OF THE EAR									
Inflammation of the external meatus, acute		5	3		1	1		17	22
Abscess of the external meatus		1	1					1	1
Accumulation of wax								6	6
Inflammation of the middle ear		3	2			1		8	11
Perforation of membrana tympani								1	1
Deafness		1			1			1	2
DISEASES OF THE NOSE									
Epistaxis		2		1	1			32	34
Nasal catarrh		1		1				5	5
Abscess								26	27
Ozæna		1			1			1	1
DISEASES OF THE CIRCULATORY SYSTEM									
Valvular disease:	2	19		12	2	4	3	70	91
Aortic	1	3		1	1		2	11	15
Mitral	1	10		8		3		24	35
Inflammation of heart								2	2
Degeneration of heart, fatty								3	3
Dilatation of heart		1				1			1
Angina pectoris								4	4
Palpitation and irregular action of heart		1		1				6	7
Degeneration of arteries								5	5
Aneurism of arteries		4		2	1		1	2	6
Varix								13	13
DISEASES OF THE RESPIRATORY SYSTEM									
Hay-asthma	8	119	68	40	2	10	7	488	615
Laryngitis:								1	1
Acute		3	3					4	7
Chronic								1	1
Bronchitis:									
Acute	1	48	35	8		4	2	356	405
Chronic	1	5	1	4	1			35	41
Catarrhal		11	6	4			1	21	32
Spasmodic asthma	1	8	2	7				30	39
Passive congestion of lung		1	1					2	3
Hæmoptysis	1	5	2	2		2		11	17
Pneumonia		22	10	7		3	2	4	26

TABLE VII.—*Tabular statement, by districts, of diseases and injuries, etc.—Continued.*

SOUTH ATLANTIC.

DISEASES.	NUMBER OF CASES.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Total treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases.									
DISEASES OF THE RESPIRATORY SYSTEM—Continued.									
Cirrhosis of lung	1			1					1
Pneumonic phthisis, chronic	1	5		5			1	5	11
Emphysema		2	1	1					2
Pleurisy :									
Acute	1	6	6				1	8	15
Chronic		3		1	1	1		9	12
Empyema	1		1						1
Adhesions of pleura								1	1
DISEASES OF THE DIGESTIVE SYSTEM	8	113	91	23	2	3	2	935	1,056
Stomatitis								6	6
Ulcerative stomatitis	1	1						1	2
Caries of dentine and cementum								25	25
Abscess of dental periosteum		2	2					2	4
Ulceration of gums and alveoli								1	1
Toothache								3	3
Elongated uvula								1	1
Relaxed throat								2	2
Sore throat		5	3	2				53	58
Quinsy	1		1					9	10
Follicular tonsillitis		6	6					23	29
Inflammation of salivary glands								2	2
Abscess of salivary glands								1	1
Follicular inflammation of the pharynx		2	2					28	30
Ulceration of pharynx								2	2
Inflammation of the stomach	1	3	2	1			1	1	5
Ulceration of the stomach		1		1			1	4	5
Dyspepsia		10	8	2				210	220
Gastrodynia								3	3
Catarrhal inflammation of the intestines								4	4
Hæmorrhage of the intestines		1	1						1
Enteritis		1	1					1	2
Typhlitis		1	1						1
Hernia		10	1	6	2	1		72	82
Diarrhœa	3	47	44	4		1	1	167	217
Constipation		1	1					239	240
Colic	1	3	4					19	23
Abscess of the rectum		1		1					1
Abscess of the anus								2	2
Piles :									
Internal		4	2	2				10	14
External	1	3	3	1				18	22
Fistula in ano		1	1					2	3
Pruritus ani								1	1
Hypertrophy of the liver								1	1
Congestion of the liver		3	2	1				10	13
Cirrhosis of liver								2	2
Abscess of liver		1	1						1
Jaundice	1	4	4	1				7	12
Gallstones								2	2
Biliary colic		1		1				1	2
Ascites		1				1			1
DISEASES OF THE LYMPHATIC SYSTEM	4	100	80	16			8	149	253
Induration and enlargement from ague		2	2						2
Hypertrophy of lymph-glands								4	4
Inflammation of lymph-glands	2	52	42	6			6	111	165
Suppuration of lymph-glands	2	46	36	10			2	34	82
DISEASES OF THE URINARY SYSTEM	1	35	16	14		4	2	73	109
Congestion of the kidney		1	1					5	6
Acute nephritis		7		4		2	1	6	13
Bright's disease		5	2			2	1	6	11
Abscess of kidney								1	1
Calculus in kidney		1		1					1

TABLE VII.—*Tabular statement, by districts, of diseases and injuries, etc.*—Continued.

SOUTH ATLANTIC.

DISEASES.	NUMBER OF CASES.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Total treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases.									
DISEASES OF URINARY SYSTEM—Continued.									
Calculus in ureter		1		1					1
Nephralgia								1	1
Diabetes insipidus								1	1
Hæmaturia		1	1					6	7
Lithuria								1	1
Hæmorrhage of bladder		1	1					1	2
Inflammation of the bladder:									
Acute		13	6	7				12	25
Sub-acute		1	1					2	3
Chronic	1	1	1	1				17	19
Irritability of bladder		1	1					10	11
Retention of urine		2	2					2	4
Incontinence of urine								2	2
DISEASES OF THE GENERATIVE SYSTEM	12	109	83	26	2	2	8	322	443
Urethritis		3	2	1				4	7
Gleet								21	21
Urinary abscess								1	1
Stricture of the urethra:									
Organic	3	17	6	9		2	3	23	43
Spasmodic		1		1				2	3
Impacted calculus of urethra		1	1						1
Oedema of the penis		1	1						1
Inflammation of glans penis		4	3	1				20	24
Ulcer of penis	9	49	41	12	1		4	190	248
Phimosis		4	3	1				2	6
Paraphimosis								1	1
Inflammation of spermatic cord								1	1
Varicocele								5	5
Hydrocele of tunica vaginalis								5	5
Orchitis:									
Acute		21	20	1				17	38
Chronic		1			1			3	4
Epididymitis		6	5				1	15	21
Spermatorrhœa								4	4
Impotence								4	4
Inflammation of the ovary								1	1
Inflammation of the vagina								1	1
Menorrhagia		1	1						1
Leucorrhœa								1	1
Inflammation of the female breast								1	1
DISEASES OF THE ORGANS OF LOCOMOTION	1	23	14	5		1	4	30	54
Ostitis								3	3
Periostitis		1	1					5	6
Caries		2		1			1		2
Necrosis		5	3	1			1	4	9
Synovitis:									
Acute		8	7	1				2	10
Chronic								4	4
Degeneration of cartilage		1		1					1
Dislocation of articular cartilage								1	1
Psoas abscess	1					1			1
Atrophy of muscles								3	3
Gangrene of muscles		1	1				1		1
Inflammation of tendons		1	1					3	4
Inflamed bursa		2	2					1	3
Bursal abscess		1					1		1
Ganglion								3	3
Bursal tumor		1		1				1	2
DISEASES OF THE CONNECTIVE TISSUE	4	57	52	8			1	62	123
Oedema	1	5	4	1			1	2	8
Inflammation		11	11					16	27
Abscess	3	41	37	7				44	88

TABLE VII.—*Tabular statement, by districts, of diseases and injuries, etc.*—Continued.

SOUTH ATLANTIC.

DISEASES.	NUMBER OF CASES.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Total treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases.									
DISEASES OF THE SKIN.....	4	62	47	14	.....	.....	5	368	434
Erythema.....								6	6
Roseola.....								2	2
Urticaria.....								8	8
Eczema.....	1	1	1	1	.....	.....	.....	58	60
Intertrigo.....								2	2
Impetigo.....								2	2
Ecthyma.....								1	1
Pityriasis.....								4	4
Prurigo.....								2	2
Lichen.....		1	1	.....	.....	.....	.....	.....	1
Psoriasis.....		2	.....	1	.....	.....	1	9	11
Herpes.....		1	1	.....	.....	.....	.....	15	16
Zona.....		1	1	.....	.....	.....	.....	.....	1
Pemphigus.....								1	1
Acne.....								18	18
Sycosis.....								1	1
Steatorrhœa.....								1	1
Chloasma.....								1	1
Chilblain.....								4	4
Frostbite.....	1	3	4	.....	.....	.....	.....	6	10
Ulcer.....	1	23	15	7	.....	.....	2	87	111
Fissures.....								2	2
Boil.....		10	5	4	.....	.....	.....	54	64
Carbuncle.....		5	5	.....	.....	.....	1	7	12
Whitlow.....	1	12	12	1	.....	.....	.....	22	35
Onychia.....								1	1
Corn.....								1	1
Lupus.....								5	5
Cheloid.....								1	1
Wen.....		1	1	.....	.....	.....	.....	5	6
Pruritus.....								3	3
Ringworm.....									
Favus.....								13	13
Tinea versicolor.....		1	1	.....	.....	.....	.....	.....	1
Itch.....								4	4
Phthiriasis.....								18	18
Malingery.....		1	.....	.....	.....	.....	1	2	3
Poisons.....		5	4	.....	.....	1	.....	5	10
Arsenic.....		1	1	.....	.....	.....	.....	.....	1
Alcohol.....		4	3	.....	.....	1	.....	1	5
Belladonna.....								2	2
Tobacco.....								1	1
Oak.....								1	1
POISONED WOUNDS.....		1	1	.....	.....	.....	.....	.....	1
Venomous animals.....		1	1	.....	.....	.....	.....	.....	1
Injuries.....	14	236	177	49	.....	5	19	323	573
GENERAL INJURIES.....	1	15	10	6	.....	.....	.....	24	40
Burns and scalds.....	1	8	5	4	.....	.....	.....	19	28
Effects of cold.....								4	4
Sunstroke.....		5	3	2	.....	.....	.....	.....	5
Multiple injury.....		2	2	.....	.....	.....	.....	.....	2
Exhaustion.....								1	1
LOCAL INJURIES.....	13	221	167	43	.....	5	19	299	533
Wound of nerve.....								1	1
Strain of muscles.....		2	2	.....	.....	.....	.....	7	9
Foreign body in subcutaneous tissue.....								2	2
Contusion of scalp.....		2	2	.....	.....	.....	.....	.....	2
Scalp wound:									
Bone not exposed.....		10	5	3	.....	.....	2	7	17
Bone exposed.....		6	5	.....	.....	.....	1	3	9
Concussion of brain.....		4	3	1	.....	.....	.....	.....	4

TABLE VII.—*Tabular statement, by districts, of diseases and injuries, etc.—Continued.*

SOUTH ATLANTIC.

DISEASES.	NUMBER OF CASES.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Total treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Injuries.									
LOCAL INJURIES—Continued.									
Contusion of face.....		2	2					5	6
Wound of face.....		4	4					12	17
Fracture of facial bones.....	1	1	2					1	3
Contusion of the eye.....		1	1						1
Foreign body in cornea or conjunctiva.....		1	1					3	4
Wound of cornea.....								1	1
Wound of pinna.....								1	1
Foreign body in external meatus.....								1	1
Contusion of soft parts of neck.....		1	1						1
Contusion of the chest.....	1	11	8	4				17	29
Fracture of the ribs.....		5	2	1		1	1	2	7
Wound of parietes of chest.....		2	1	1					2
Perforating wound of chest.....	1		1						1
Contusion of back.....		6	6					7	13
Sprain of back.....		12	8	4				19	31
Wound of back.....		2	2					1	3
Fracture of spine.....	2			2					2
Contusion of abdomen.....		1	1						1
Wound of parietes of abdomen.....		4	2			2			4
Wound of organs of generation.....								1	1
Fracture and dislocation of pelvis.....		1					1		1
Contusion of testicle.....								1	1
Foreign body in the rectum.....								1	1
Contusion of upper extremities.....		11	9	2				29	40
Sprain of the shoulder.....		2	1	1				1	3
Sprain of the elbow.....								3	3
Sprain of the wrist.....		3	2	1				10	13
Sprain of the fingers.....		1	1					3	4
Wound of the upper extremities.....	1	43	38	4		1	1	71	115
Fracture of the clavicle.....		2	2					1	3
Fracture of the scapula.....		1	1					1	2
Fracture of the humerus.....		1					1		1
Fracture of the radius.....		1	1						1
Fracture of the ulna.....		7	3	4				2	9
Fracture of carpus, metacarpus, and phalanges.....	1	3	3	1				4	8
Dislocation of the humerus.....		1	1					2	3
Contusion of the lower extremities.....		23	18	4			1	21	44
Sprain of the hip.....								2	2
Sprain of the knee.....		1		1				13	14
Sprain of the ankle.....	1	9	5	3			2	12	22
Sprain of the foot.....		1	1					5	6
Wound of the lower extremities.....	2	11	12	1				19	32
Fracture of femur.....	2	7	4	3			2	1	10
Fracture of patella.....		1					1	1	2
Fracture of leg, both bones.....	1	5	4			1	1	2	8
Fracture of tibia alone.....		3	1				2	1	4
Fracture of fibula alone.....		3					3	1	4
Fracture of metatarsus.....								1	1
Fracture of phalanges of toes.....		1		1					1
Dislocation of the foot at the ankle.....		2	1	1					2
AMPUTATIONS.....		1	1						1
Amputation of fingers.....		1	1						1

THE GULF.

TOTAL CASES.....	97	1,594	1,092	431	18	52	98	3,929	5,620
General Diseases.....	48	853	580	234	11	27	49	1,580	2,481
Dengue.....								3	3
Influenza.....								2	2
Mumps.....		15	12	3				15	30
Simple continued fever.....		4	4						4

TABLE VII.—*Tabular statement, by districts, of diseases and injuries, etc.—Continued.*

DISEASES.	NUMBER OF CASES.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Total treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
General Diseases.									
Enteric fever		6	2			1	3		6
Typho-malaria fever		2	1				1		2
Cholera, sporadic		1	1					1	2
Epidemic diarrhœa								3	3
Dysentery		27	22	1		1	3	45	72
Malarial intermittent fever	10	278	267	11		2	8	455	743
Malarial remittent fever	6	93	89	3		3	4	17	116
Malarial cachexia	2	22	20	2			2	74	98
Phagedœna		1	1						1
Erysipelas:									
Simple	1	3	3	1				3	7
Phlegmonous		1	1						1
Syphilis:									
Primary	4	50	23	26	3		2	52	106
Secondary	13	103	3	106	1	1	5	166	282
Gonorrhœa		33	21	11			1	284	317
Alcoholism		9	7	1		1		9	18
Delirium tremens								1	1
Debility		18	15	2		1		35	53
Rheumatic fever		25	16	4	1		4	5	30
Rheumatism	6	88	70	17	1	1	5	295	389
Gout		2		1			1		2
Osteo-arthritis		2		1			1	1	3
Non-malignant new growth		4	2	2				20	24
Sarcoma		1				1		1	2
Carcinoma		1		1					1
Epithelioma		2		1	2			1	4
Tubercle of lung and other organs	6	53		38	2	16	8	81	145
Scrofula		1		1					1
Leprosy		1					1	5	6
Purpura		1		1					1
Anæmia								5	5
Hæmophilia								1	1
Local Diseases	33	563	349	172	7	25		2,039	2,635
DISEASES OF THE NERVOUS SYSTEM									
Congestion of cerebrum		1	1						1
Hæmorrhage of cerebrum		1				1			1
Hæmorrhage of spinal cord		1					1		1
Anæmia		1	1					1	2
Inflammation of membranes of brain and spinal cord		1				1			1
Myelitis		1		1					1
Neuritis	1	1	2					3	5
Softening of brain or cord		1		1			1		1
Sclerosis		1		1				1	2
Locomotor ataxy	2	1		2			1		3
Apoplexy		1					1	1	2
Paralysis		1					1	1	2
Hemiplegia		1		1				3	4
Paraplegia	1						1		1
Local paralysis		1	1					1	2
Anæsthesia								1	1
Laryngismus stridulus								1	1
Spasm of muscle								4	4
Hyperæsthesia								1	1
Neuralgia	1	1	2					32	34
Facial		2	1	1				12	14
Sciatica		4	3	1				5	9
Vertigo		1					1	7	8
Megrim		1	1					12	13
Tetanus		1	1					1	2
Epilepsy		2		2				4	6
Hysteria		1	1					8	9
Hypochondriasis		2		2				1	3

TABLE VII.—*Tabular statement, by districts, of diseases and injuries, etc.*—Continued.

THE GULF.									
DISEASES.	NUMBER OF CASES.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Total treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases.									
DISEASES OF THE NERVOUS SYSTEM—Cont'd.									
Insanity.....		1				1			1
Melancholia.....		1	1						1
Dementia.....		3		2			1		3
General paralysis of the insane.....		1				1			1
DISEASES OF THE EYE.....									
Echymosis of the conjunctiva.....		12	7	2			3	45	57
Conjunctivitis:								1	1
Catarrhal.....		3	3					25	28
Purulent.....		1	1						1
Membranous.....								2	2
Chronic.....		1					1		1
Granular.....								3	3
Pterygium.....		2	2					1	3
Ulcer of cornea.....		1		1					1
Staphyloma of cornea.....		1					1		1
Iritis.....								6	6
Glaucoma.....		1					1		1
Retinitis.....								1	1
Cataract, lenticular.....								1	1
Amblyopia.....		1		1				1	2
Hæmatoma.....								1	1
Blepharitis.....		1	1					1	2
Abscess of eyelid.....								1	1
Chalazion.....								1	1
DISEASES OF THE EAR.....									
Inflammation of the external meatus, acute.....		5	3	1			1	20	25
Abscess of the external meatus.....		1	1						1
Accumulation of wax.....								2	2
Inflammation of the middle ear.....								5	5
Ulceration of membrana tympani.....		3	2	1				11	14
Perforation of membrana tympani.....								1	1
Deafness.....		1					1		1
DISEASES OF THE NOSE.....									
Epistaxis.....		1		1				36	37
Nasal catarrh.....								1	1
Ulceration.....		1		1				31	32
								4	4
DISEASES OF THE CIRCULATORY SYSTEM.....									
Valvular disease:	3	25	4	16	2	6		30	58
Aortic.....	1	8		6		3		3	12
Mitral.....	2	6		3	2	3		9	17
Hypertrophy of heart.....		2		2					2
Palpitation and irregular action of heart.....		5	4	1				13	18
Aneurism of arteries.....		2		2				4	6
Varix.....		2		2				1	3
DISEASES OF THE RESPIRATORY SYSTEM.....									
Laryngitis:	3	85	62	16		8	2	359	442
Acute.....		1	1					1	2
Chronic.....		1				1			1
Catarrhal.....								1	1
Bronchitis:									
Acute.....		26	23	3				240	266
Chronic.....		9	3	5		1		42	51
Catarrhal.....		3	1	2				28	33
Spasmodic asthma.....		1	1					17	18
Hæmoptysis.....								1	1
Œdema of lung.....		1	1						1
Pneumonia.....	3	23	20	2		3	1	3	29
Cirrhosis of lung.....								1	1
Pneumonic phthisis:									
Acute.....									9
Chronic.....		6		3		2	1	3	11

TABLE VII.—*Tabular statement, by districts, of diseases and injuries, etc.—Continued.*

THE GULF.

DISEASES.	NUMBER OF CASES.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Total treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases.									
DISEASES OF THE SKIN—Continued.									
Cheloid.....								3	3
Wen.....		2	2					1	3
Pruritus.....								11	11
Hyperidrosis.....								1	1
Ringworm.....								6	6
Tinea versicolor.....								1	1
Itch.....		1		1				2	3
Undetermined.....		1		1					1
Poisons		1		1				4	5
Lead.....		1		1					1
Alcohol.....								1	1
Turpentine.....								1	1
Tobacco.....								1	1
Poisonous fish.....								1	1
POISONED WOUNDS		1	1						1
Vegetable substances		1	1						1
Injuries	16	176	162	24			6	305	497
GENERAL INJURIES	1	9	10					14	24
Burns and scalds.....		8	8					13	21
Effects of cold.....								1	1
Sunstroke.....	1		1						1
Multiple injury		1	1						1
LOCAL INJURIES	15	167	152	24			6	291	473
Strain of muscles.....		1	1					7	8
Strain of tendon.....		1	1					1	3
Foreign body in subcutaneous tissue.....								3	3
Contusion of scalp.....		3	3						3
Scalp-wound:									
Bone not exposed		6	6					10	16
Bone exposed.....		6	5	1					6
Contusion of skull.....		1	1						1
Concussion of brain.....		2	2						2
Contusion of face.....		2	2						6
Wound of face.....		4	4					7	11
Fracture of facial bones.....		5	1	3		1			5
Contusion of the eye.....		1		1				5	6
Foreign body in cornea or conjunctiva.....		1	1					2	3
Wound of pinna.....		1	1						1
Foreign body in the œsophagus.....								1	1
Contusion of the chest.....		2	1	1				17	19
Fracture of the ribs.....	1	6	5	2				6	13
Wound of parietes of chest.....			1					3	4
Penetrating wound of pleura or lung.....		1	1					1	2
Contusion of back.....	1	11	11	1				15	27
Sprain of back.....		4	3	1				14	18
Wound of back.....		1	1					2	3
Wound of organs of generation.....		1		1				2	3
Fracture and dislocation of pelvis.....		1	1						1
Contusion of upper extremities.....	1	11	9	3				17	29
Sprain of the shoulder.....								23	23
Sprain of the elbow.....								7	7
Sprain of the wrist.....		3	3					7	10
Sprain of the fingers.....								1	1
Wound of the upper extremities.....	2	20	20	2				53	75
Fracture of the clavicle.....		2	1	1					2
Fracture of the humerus.....		3	3					1	4
Fracture of the radius.....		2	2					2	4
Fracture of the ulna.....								1	1
Fracture of both bones of forearm.....		2	1	1				2	4

TABLE VII.—*Tabular statement, by districts, of diseases and injuries, etc.*—Continued.

THE GULF.									
DISEASES.	NUMBER OF CASES.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Total treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Injuries.									
LOCAL INJURIES—Continued.									
Fracture of carpus, metacarpus, and phalanges		2	1				1	1	3
Dislocation of the humerus	1	1	2						2
Dislocation of the radius		1	1						1
Contusion of the lower extremities	1	17	18					24	42
Sprain of the hip								1	1
Sprain of the knee		1	1					7	8
Sprain of the ankle		3	2	1				11	14
Sprain of the foot		1	1					1	2
Wound of the lower extremities	3	24	24	2		1		29	56
Fracture of femur		4	3			1		1	5
Fracture of patella	1	2	1	2					3
Fracture of leg, both bones	1	4	2	1		2			5
Fracture of tibia alone	1		1						1
Fracture of fibula alone		1	1					1	2
Fracture of metatarsus	1		1						1
Fracture of phalanges of toes								1	1
Dislocation of the knee	1	1	2						2
AMPUTATIONS									
Amputation of fingers								1	1
								1	1
THE OHIO.									
TOTAL CASES	58	1,277	882	304	26	47	76	3,795	5,130
General Diseases	36	560	370	154	11	30	31	1,769	2,365
Measles		3	3						3
Influenza								4	4
Whooping-cough		1		1					1
Mumps		12	9	3				5	17
Simple continued fever								1	1
Enteric fever	6	16	16			5	1		22
Typho-malarial fever		1	1						1
Cholera, sporadic		1	1					1	2
Dysentery	2	10	9	2			1	19	31
Malarial intermittent fever	5	132	121	6		3	7	341	478
Malarial remittent fever	2	18	20					6	26
Malarial cachexia		6	4	1			1	24	30
Phagedæna		1	1					3	4
Erysipelas, simple		6	6					6	12
Septicæmia		2				2			2
Syphilis:									
Primary	1	31	13	16			3	63	95
Secondary	4	96	8	81	5		6	445	545
Gonorrhœa	2	25	21	4	1		1	377	404
Alcoholism	1	11	10		1	1		16	28
Delirium tremens		1	1						1
Debility		6	4	2				39	45
Effects of heat		1	1					1	2
Rheumatic fever	1	12	9	3		1		19	32
Rheumatism	5	123	108	11	1	2	6	329	457
Osteo-arthritis		1		1					1
Lipoma								1	1
Adenoma		1		1					1
Warts								8	8
Condyloma		4	4					5	9
Carcinoma		2				2			2
Epithelioma									
Scirrhus		1			1			2	2
Tubercle of lung	7	31		19	1	13	5	43	81
Acute miliary tuberculosis		1			1				1
Scrofula		3		3				8	11

TABLE VII.—*Tabular statement, by districts, of diseases and injuries, etc.—Continued.*

THE OHIO.

DISEASES.	NUMBER OF CASES.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Total treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
General Diseases.									
Anæmia.....								1	1
Diabetes mellitus		1				1		2	3
Local Diseases.....	20	569	396	124	14	14	41	1,824	2,413
DISEASES OF THE NERVOUS SYSTEM									
Congestion of cerebrum.....	4	13	8	4	1	2	2	101	118
Hæmorrhage, cerebral.....								10	10
Neuritis.....								1	1
Sclerosis.....	1					1		2	2
Apoplexy.....	1				1			1	2
Hemiplegia.....	1						1		1
Spasm of muscle.....		1					1		1
Aphasia.....								1	1
Neuralgia.....		3	2			1		50	53
Facial.....		3	3					14	17
Sciatica.....	1	2	2	1				10	13
Vertigo.....								4	4
Megrim.....								4	4
Epilepsy.....		2		2				2	4
Hypochondriasis.....								1	1
Melancholia.....		2	1	1				1	3
DISEASES OF THE EYE									
Conjunctivitis:	1	10	5	4			2	42	53
Catarrhal.....		2	1	1				15	17
Purulent.....		1	1					9	10
Phlyctenular.....		1		1				3	4
Chronic.....								1	1
Granular.....	1	3	2	1			1	4	8
Ulcer of cornea.....		1	1						1
Staphyloma of cornea.....								1	1
Iritis.....		1					1	2	3
Congestion of optic disc.....								1	1
Hypermetropia.....								1	1
Astigmatism.....		1		1					1
Diplopia.....								1	1
Chalazion.....								4	4
DISEASES OF THE EAR									
Inflammation of the external meatus:		1	1					22	23
a. Acute.....								2	2
b. Chronic.....								3	3
Abscess of the external meatus.....								1	1
Accumulation of wax.....								7	7
Inflammation of the middle ear.....		1	1					7	8
Obstruction of Eustachian tube.....								2	2
DISEASES OF THE NOSE									
Epistaxis.....		2	1				1	57	59
Inflammation.....		1	1					1	2
Nasal catarrh.....								4	4
Ozæna.....		1					1	52	52
DISEASES OF THE CIRCULATORY SYSTEM.....									
Pericarditis.....	1	10	1	8	1	1		60	71
Valvular disease, mitral.....		1		1				1	1
Hypertrophy of heart.....	1	4		4		1		14	19
Inflammation of heart.....								13	13
Degeneration of heart, fatty.....		1		1					1
Palpitation and irregular action of heart.....								1	1
Aneurism of arteries.....								5	5
Varix.....		2		1	1			8	10
DISEASES OF THE RESPIRATORY SYSTEM.....									
Hay-asthma.....		2						19	21
Laryngitis, acute.....		1	1						
								1	1

TABLE VII.—*Tabular statement, by districts, of diseases and injuries, etc.—Continued.*

THE OHIO.									
DISEASES.	NUMBER OF CASES.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Total treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases.									
DISEASES OF THE URINARY SYSTEM									
Acute nephritis		13	3	9	1			74	87
Bright's disease		2	1	1				1	3
Diabetes insipidus		6		6				24	30
Hæmaturia								2	2
Inflammation of bladder:		1		1				1	2
Acute		2	1	1				29	31
Sub-acute								4	4
Chronic								2	2
Suppurative		1	1					1	1
Irritability of bladder								10	10
Retention of urine								1	1
Incontinence of urine		1			1				1
DISEASES OF THE GENERATIVE SYSTEM									
Urethritis	5	120	85	24	6		10	307	432
Gleet		1	1					6	7
Stricture of urethra, organic	2	21	15	3	4		1	40	63
Hypertrophy of prostate gland								7	7
Chronic inflammation of prostate gland								1	1
Inflammation of the penis		1	1						1
Inflammation of glans penis		1	1					13	14
Abscess of penis		1	1						1
Ulcer of penis	1	67	46	14	2		6	147	215
Gangrene of penis		1	1						1
Phimosis		5	2	3					5
Paraphimosis								1	1
Chordee								1	1
Hydrocele of spermatic cord								1	1
Varicocele		1		1				5	6
Hydrocele of tunica vaginalis		2	2					4	6
Orchitis, acute		9	5	2			2	9	18
Epididymitis		8	7				1	19	27
Spermatorrhœa								5	5
Impotence								12	12
Hæmorrhage of the uterus								2	2
Inflammation of the uterus	1		1						1
Catarrh of the uterus		1	1						1
Displacements of the uterus	1	1	1	1					2
Prolapse of the vagina								2	2
Amenorrhœa								3	3
Dysmenorrhœa								2	2
DISEASES OF THE ORGANS OF LOCOMOTION									
Hypertrophy of femur	3	22	12	10			3	26	51
Ostitis		1	1	1				2	2
Periostitis	1	1	1	1				1	2
Osteo myelitis		1	1						1
Chronic abscess of bones		1					1		1
Caries		1	1					1	2
Necrosis	1	4	3	1			1	8	13
Synovitis:									
Acute	1	5	3	2			1	2	8
Chronic		3		3				2	5
Abscess of joints		1		1					1
Ankylosis								2	2
Dislocation of articular cartilage								1	1
Caries and necrosis of spine		1		1					1
Abscess of muscles		1		1					1
Inflammation of tendons								5	5
Inflamed bursa								2	2
Bursal abscess		1	1						1
Bunion		1	1						1
DISEASES OF THE CONNECTIVE TISSUE									
Edema		22	21		1			42	64
Inflammation		1	1						1
		3	3					6	9

TABLE VII.—*Tabular statement, by districts, of diseases and injuries, etc.*—Continued.

THE OHIO.

DISEASES.	NUMBER OF CASES.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Total treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases.									
DISEASES OF THE CONNECTIVE TISSUE—Con.									
Abscess		18	17		1			35	53
Undue formation of fat.....								1	1
DISEASES OF THE SKIN									
Erythema	3	36	24	12	1		2	186	225
Urticaria		1	1					5	5
Eczema		3	2	1				8	9
Intertrigo								27	30
Impetigo								1	1
Rupia								1	1
Ecthyma								1	1
Lichen								1	1
Psoriasis		2		2				5	7
Herpes								8	8
Zoua		2	2					5	5
Acne								13	17
Gutta rosea								1	1
Sycosis								1	1
Steatorrhœa								2	2
Alopecia								2	2
Chilblain		1	1						1
Frostbite		2	2					1	3
Ulcer	2	20	11	9	1		1	32	54
Fissures								1	1
Boil		1	1					28	29
Carbuncle		2	2					1	3
Whitlow		1	1					6	7
Onychia								4	4
Corn								1	1
Wen								3	3
Pruritus								2	2
Bromidrosis								1	1
Ringworm								1	1
Itch	1	1	1				1	16	18
Phthiriasis								5	5
Poisons									
Lead		1	1						1
Tobacco								2	2
Injuries.....									
	2	147	115	26	1	3	4	200	349
GENERAL INJURIES									
Burns and scalds		10	6	3		1		9	19
Multiple injury		9	6	3				9	18
		1				1			1
LOCAL INJURIES									
Strain of muscles	2	137	109	23	1	2	4	191	330
Scalp wound:		4	4					7	11
Bone not exposed		2	1	1				4	6
Bone exposed								2	2
Fracture of the vault of the skull		1				1			1
Contusion of face		2	2					2	4
Wound of face and mouth		7	6			1		4	11
Fracture of facial bones	1	1	1	1				1	3
Contusion of the eye		1	1					3	4
Foreign body in cornea or conjunctiva								5	5
Wound of eyelid								1	1
Wound of conjunctiva								1	1
Wound of pinna		1	1					3	4
Wound of neck		1	1					1	2
Contusion of the chest		7	7					4	11
Fracture of the ribs	1	2	2	1				2	5
Wound of parietes of chest		4	2	1			1	2	6

TABLE VII.—*Tabular statement, by districts, of diseases and injuries, etc.*—Continued.

THE OHIO.

DISEASES.	NUMBER OF CASES.									
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Total treated in hospital and dispensary.	
			Recovered.	Improved.	Not improved.					
Injuries.										
LOCAL INJURIES—Continued.										
Perforating wound of chest.....		1	1	.....	.....	.....	.....	1	2	
Penetrating wound of pleura or lung ..		1	1	.....	.....	.....	.....	.....	1	
Contusion of back.....		3	3	.....	.....	.....	.....	3	6	
Sprain of back.....		11	9	2	.....	.....	.....	9	20	
Wound of back.....		1	1	.....	.....	.....	.....	.....	1	
Contusion of cord.....								1	1	
Wound of parietes of abdomen.....		2	2	.....	.....	.....	.....	.....	2	
Contusion of upper extremities.....		4	3	.....	1	.....	.....	14	18	
Sprain of the shoulder.....		1	1	.....	.....	.....	.....	1	2	
Sprain of the wrist.....		1	1	.....	.....	.....	.....	11	12	
Wound of the upper extremities.....		14	10	4	.....	.....	.....	52	66	
Fracture of the clavicle.....		1	.....	1	.....	.....	.....	.....	1	
Fracture of the radius.....		4	3	1	.....	.....	1	1	5	
Fracture of both bones of forearm.....		2	1	1	.....	.....	.....	.....	2	
Fracture of carpus, metacarpus, and phalanges.....								1	1	
Contusion of the lower extremities.....		13	12	1	.....	.....	.....	14	27	
Sprain of the hip.....								2	2	
Sprain of the knee.....		1	1	.....	.....	.....	.....	4	5	
Sprain of the ankle.....		15	13	2	.....	.....	.....	23	38	
Sprain of the foot.....		1	1	.....	.....	.....	.....	2	3	
Wound of the lower extremities.....		15	10	5	.....	.....	.....	7	22	
Fracture of femur.....		3	3	.....	.....	.....	.....	2	5	
Fracture of patella.....		2	.....	2	.....	.....	.....	.....	2	
Fracture of leg, both bones.....		2	1	.....	.....	.....	1	.....	2	
Fracture of tibia alone.....		1	1	.....	.....	.....	.....	.....	1	
Fracture of fibula alone.....		3	2	.....	.....	.....	1	.....	3	
Fracture of tarsus.....		1	.....	1	.....	.....	.....	.....	1	
Fracture of metatarsus.....		1	1	.....	.....	.....	.....	1	2	

THE MISSISSIPPI.

TOTAL CASES.....	63	1,217	850	297	13	.....	75	3,148	4,428
General Diseases.....	30	639	426	182	7	20	34	1,647	2,316
Small-pox.....	.....	1	.....	.....	1	.....	.....	1	2
Cow-pox.....	.....	.....	.....	.....	.....	.....	.....	33	33
Measles.....	.....	3	3	.....	.....	.....	.....	2	5
Mumps.....	.....	2	2	.....	.....	.....	.....	7	9
Diphtheria.....	.....	2	1	.....	.....	.....	1	.....	2
Simple continued fever.....	.....	2	1	.....	.....	.....	.....	.....	2
Enteric fever.....	.....	3	2	.....	.....	.....	1	.....	3
Typho-malarial fever.....	.....	1	1	.....	.....	.....	.....	.....	1
Dysentery.....	2	47	38	4	.....	4	3	22	71
Malarial intermittent fever.....	6	200	186	11	1	5	3	429	635
Malarial remittent fever.....	1	25	22	2	.....	1	1	5	31
Malarial cachexia.....	2	12	11	2	.....	.....	1	111	125
Erysipelas, simple.....	.....	5	5	.....	.....	.....	.....	5	10
Syphilis:	.....	.....	.....	.....	.....	.....	.....	.....	.....
Primary.....	2	50	24	25	.....	.....	3	111	163
Secondary.....	3	109	16	86	1	1	8	219	331
Gonorrhœa.....	2	22	20	4	.....	.....	.....	247	271
Alcoholism.....	.....	12	11	1	.....	.....	.....	12	24
Debility.....	.....	1	.....	1	.....	.....	.....	5	6
Effects of heat.....	.....	.....	.....	.....	.....	.....	.....	3	3
Rheumatic fever.....	.....	10	6	1	.....	2	1	3	13
Rheumatism.....	3	98	73	20	2	.....	6	320	421
Gout.....	.....	1	.....	.....	.....	.....	1	.....	1
Osteo-arthritis.....	.....	.....	.....	.....	.....	.....	.....	1	1
Fibroma.....	.....	.....	.....	.....	.....	.....	.....	6	6
Lipoma.....	.....	1	.....	1	.....	.....	.....	.....	1
Angioma.....	1	.....	.....	.....	.....	1	.....	.....	1
Warts.....	.....	1	1	.....	.....	.....	.....	7	8

TABLE VII.—*Tabular statement, by districts, of diseases and injuries, etc.*—Continued.

THE MISSISSIPPI.

DISEASES.	NUMBER OF CASES.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Total treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases.									
DISEASES OF THE RESPIRATORY SYSTEM—Continued.									
Bronchitis:									
Acute		16	12	4				155	171
Chronic		6	5	1				15	21
Catarrhal								32	32
Spasmodic asthma								4	4
Hæmoptysis				1				2	2
Pneumonia	35	27	1			7		1	36
Pneumonia phthisis, chronic	6		3			2	1	3	9
Pleurisy:									
Acute		15	11	1	1	2		18	33
Chronic		1	1					1	2
DISEASES OF THE DIGESTIVE SYSTEM	6	101	80	18		3	6	461	568
Stomatitis								1	1
Ulcerative stomatitis								1	1
Caries of dentine and cementum								8	8
Abscess of dental periosteum								1	1
Ulcer of the tongue								1	1
Relaxed throat								1	1
Sore throat								13	13
Quinsy		4	4					2	6
Follicular tonsillitis		1	1					13	14
Inflammation of salivary glands		1	1						1
Follicular inflammation of the pharynx		2	2					25	27
Post-pharyngeal abscess		1	1						1
Dilatation of pharynx								1	1
Inflammation of the stomach		6	4			1	1	20	26
Ulceration of the stomach		1	1						1
Dyspepsia		6	3	3				72	78
Gastrodynia								2	2
Pyrosis								1	1
Catarrhal inflammation of the intestines	1	23	22	1		1		67	91
Colitis		2	1	1				1	3
Hernia								44	44
Tænia solium								1	1
Oxyuris vermicularis								1	1
Diarrhœa	3	28	27	1		1	2	67	98
Constipation								43	43
Colic		2	2					10	12
Abscess of the anus		1	1						1
Ulceration of the rectum								5	5
Piles:									
Internal		1		1				8	9
External	1	4	4	1				15	20
Prolapsus of the rectum								2	2
Fissure of the anus		2	2					2	4
Hypertrophy of the liver		2		2				11	13
Congestion of the liver		2	1				1	12	14
Hepatitis		4		3			1	2	6
Cirrhosis of liver	1	3	1	3				1	5
Fatty liver		1		1					1
Jaundice		3	2	1				5	8
Inflammation of hepatic ducts and gall-bladder								1	1
Gallstones								1	1
Peritonitis		1					1		1
DISEASES OF THE LYMPHATIC SYSTEM	2	11	8	3	1		1	32	45
Induration and enlargement of the spleen from ague								1	1
Hypertrophy of lymph-glands		1			1			1	2
Inflammation of lymph-glands		6	4	2				22	28
Suppuration of lymph-glands	2	4	4	1			1	7	13
Lymphadenoma								1	1

TABLE VII.—*Tabular statement, by districts, of diseases and injuries, etc.*—Continued.

THE MISSISSIPPI.									
DISEASES.	NUMBER OF CASES.								Total treated in hospital and dispensary.
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	
			Recovered.	Improved.	Not improved.				
Local Diseases.									
DISEASES OF THE URINARY SYSTEM	9	3	4	1	1	35	44		
Acute nephritis	2	2	4	1	1	2	4		
Bright's disease	6	4	1	1	7	13			
Diabetes insipidus					1	1			
Inflammation of bladder:									
Acute	1	1				14	15		
Chronic						1	1		
Irritability of bladder						9	9		
Incontinence of urine						1	1		
DISEASES OF THE GENERATIVE SYSTEM	3	75	56	18	4	200	278		
Urethritis						2	2		
Gleet	1	1	1	1		1	1		
Stricture of urethra, organic	20	11	7		2	33	53		
Urinary fistula	1	1					1		
Hypertrophy of prostate gland						2	2		
Acute inflammation of prostate gland	1	1					1		
Inflammation of glans of penis						4	4		
Abscess of penis	1	1					1		
Ulcer of penis	2	35	28	7	2	115	152		
Phimosis	1	1				3	4		
Varicocele						1	1		
Hydrocele of tunica vaginalis	3	3				4	7		
Orchitis:									
Acute	8	5	3			16	24		
Chronic						1	1		
Epididymitis	1	3	4			8	12		
Abscess of testicle	1	1	1				1		
Spermatorrhœa						1	1		
Inflammation of the ovary						1	1		
Catarrh of the uterus						2	2		
Displacement of the uterus						2	2		
Stricture of the os uteri						5	5		
DISEASES OF THE ORGANS OF LOCOMOTION	1	10	8	1	2	15	26		
Periostitis		3	2		1	3	3		
Caries						1	1		
Necrosis	3	3				6	9		
Dropsy of joints						1	1		
Synovitis:									
Acute	3	2	1			3	6		
Chronic	1	1					2		
Ankylosis						2	2		
Dislocation of articular cartilage						1	1		
Angular curvature of spine	1				1	1	1		
Bunion						1	1		
DISEASES OF THE CONNECTIVE TISSUE	14	10	3		1	12	26		
Inflammation	2	2				5	7		
Abscess	12	8	3		1	7	19		
DISEASES OF THE SKIN	32	19	9	1	3	105	137		
Erythema	1	1				1	1		
Urticaria			1			1	1		
Eczema	3	1	1		1	29	32		
Impetigo						1	1		
Herpes						6	6		
Zona	1	1				1	1		
Acne						1	1		
Ulcer	17	11	5		1	22	38		
Boil	3	2	1			24	27		
Carbuncle	1	1				3	4		
Whitlow	4	3	1			1	5		
Onychia	1				1	1	1		
Corn						2	2		
Xanthelasma						1	1		
Wen						1	1		

TABLE VII.—*Tabular statement, by districts, of diseases and injuries, etc.—Continued.*

THE MISSISSIPPI.

DISEASES.	NUMBER OF CASES.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Total treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases.									
DISEASES OF THE SKIN—Continued.									
Pruritus.....								3	3
Ringworm.....								5	5
Itch.....								3	3
Phthiriasis.....								1	1
Irritation by stinging insects.....								1	1
Malingery.....		1			1			1	1
Poisons.....			2					10	12
Mercury.....								1	1
Alcohol.....		2	2						2
Tobacco.....								7	7
Rhns.....								2	2
Injuries.....	9	191	149	30	2	4		230	430
GENERAL INJURIES.....		13	7	6				12	25
Burns and scalds.....		11	5	6				10	21
Sunstroke.....		2	2					2	4
LOCAL INJURIES.....	9	178	142	24	2	4	15	218	405
Strain of muscles.....		1	1					3	4
Compression of nerve.....		2	1	1				2	4
Contusion of scalp.....		1					1	6	7
Scalp-wound:									
Bone not exposed.....		8	5	2			1	15	23
Bone exposed.....		1	1						1
Concussion of brain.....	1		1						1
Contusion of face.....		1				1		4	5
Wound of face.....		8	7	1				10	18
Fracture of facial bones.....		2	2						2
Dislocation of the lower jaw.....								1	1
Contusion of the eye.....		1	1					1	2
Foreign body in cornea or conjunctiva.....		1					1	6	7
Wound of eyelid.....		1		1				1	2
Wound of neck.....								1	1
Sprain of neck.....								1	1
Contusion of the chest.....		4	4					4	8
Fracture of the ribs.....		2		1			1	1	3
Wound of parietes of chest.....		8	6			1	1	3	11
Contusion of back.....		5	5					5	10
Sprain of back.....	2	11	6	2		1	4	19	32
Wound of back.....		4	4					1	5
Concussion of cord.....		1	1						1
Contusion of abdomen.....		1	1					3	4
Wound of parietes of abdomen.....								2	2
Wound of organs of generation.....								1	1
Foreign body in the rectum.....								2	2
Contusion of upper extremities.....		12	11				1	19	31
Sprain of the shoulder.....		1	1					3	4
Sprain of the wrist.....	1	2	3					5	8
Sprain of the fingers.....									1
Wound of the upper extremities.....		21	15	4			2	51	72
Fracture of the clavicle.....		4	4						4
Fracture of the humerus.....		1					1		1
Fracture of the radius.....		3	1	1	1			3	3
Fracture of both bones of forearm.....		1				1			1
Fracture of carpus, metacarpus, and phalanges.....		5	4	1					5
Dislocation of the humerus.....		4	2	1			1	1	5
Contusion of the lower extremities.....	1	18	16	3				25	44
Sprain of the hip.....								2	2
Sprain of the knee.....		2	2					1	3
Sprain of the ankle.....	1	10	10	1				11	22
Sprain of the foot.....		1	1					1	2
Wound of the lower extremities.....	2	20	20	1	1			5	22

TABLE VII.—*Tabular statement, by districts, of diseases and injuries, etc.*—Continued.

THE MISSISSIPPI.

DISEASES.	NUMBER OF CASES.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Total treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Injuries.									
LOCAL INJURIES—Continued.									
Fracture of femur.....		1	1						
Fracture of leg, both bones.....		5	2	2			1		
Fracture of tibia alone.....		2	1	1					
Fracture of fibula alone.....		1	1						
Fracture of metatarsus.....		1		1					
Dislocation of the patella.....	1		1					1	

THE GREAT LAKES.

TOTAL CASES.....	177	2,421	1,590	699	68	76	165	1,0312	1,2910
General Diseases.....	77	997	625	330	23	33	63	4,584	5,658
Small-pox.....		1	1					1	2
Cow-pox.....								4	4
Chicken-pox.....								1	1
Measles.....		5	4				1	2	7
Influenza.....		2	2					17	19
Mumps.....	1		1					8	9
Diphtheria.....		6	4	2				3	9
Simple continued fever.....		7	6				1	31	38
Febricula.....		4	4						4
Enteric fever.....	13	94	89	2		10	6	9	116
Cholera, sporadic.....		4	3				1	2	6
Epidemic diarrhœa.....								9	9
Dysentery.....	1	22	20	2		1	1	23	46
Malaria, intermittent fever.....	4	71	70	2		1	2	598	673
Malarial remittent fever.....		28	25	1			2	42	70
Malarial cachexia.....		7	7					62	69
Phagedæna.....		1	1					3	4
Erysipelas:									
Simple.....		22	19	1		1	1	24	46
Phlegmonous.....		5	4	1					5
Syphilis:									
Primary.....	1	27	17	8			3	171	199
Secondary.....	20	176	25	148	3	5	15	1,206	1,402
Gonorrhœa.....	6	73	51	19	5		4	981	1,060
Animal parasites.....								2	2
Alcoholism.....	2	54	48	7			1	27	83
Delirium tremens.....		10	7	1		1	1		10
Debility.....		12	9	3				238	250
Old age.....		1			1				1
Rheumatic fever.....	4	52	45	4	3		4	17	73
Rheumatism.....	11	230	155	70	6		10	902	1,143
Osteo-arthritis.....								2	2
Hæmatoma.....		2	2						2
Non-malignant new growth.....	1	4	3	1		1		28	33
Lymphoma.....								1	1
Carcinoma.....	1	2		2		1		1	4
Scirrhus.....		1		1					1
Tubercle of lung and other organs.....	12	71	3	53	5	12	10	153	236
Scrofula.....		2		2				7	9
Anæmia.....		1				1		4	5
Diabetes mellitus.....								5	5
Local Diseases.....	65	954	592	287	40	32	68	5,008	6,027
DISEASES OF THE NERVOUS SYSTEM.....	10	59	28	19	5	4	13	401	470
Congestion of brain.....		2	1	1					2
Inflammation:									
Of cerebral membranes.....		2				2			2
Of spinal cord and its membranes.....	1			1				2	3
Myelitis.....		1					1		1
Sclerosis.....		1		1					1

TABLE VII.—*Tabular statement, by districts, of diseases and injuries, etc.*—Continued.

THE GREAT LAKES.

DISEASES.	NUMBER OF CASES.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Total treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases.									
DISEASES OF THE NERVOUS SYSTEM—Cont'd.									
Locomotor ataxy.....	2	2	.....	1	.....	.....	3	6	10
Apoplexy.....		1	.....	1	.....	.....	.....	.....	1
Paralysis.....								2	2
Hemiplegia.....	2	9	1	2	2	2	4	2	13
Paraplegia.....		2	.....	1	.....	.....	1	.....	2
Local paralysis.....	1	3	.....	2	1	.....	1	7	11
Anæsthesia.....		1	1	.....	.....	.....	.....	.....	1
Eclampsia.....								1	1
Neuralgia.....	1	22	18	3	2	.....	.....	293	316
Facial.....	1	1	1	1	.....	.....	.....	25	27
Sciatica.....	1	7	6	1	.....	.....	1	19	27
Vertigo.....	1	2	.....	1	.....	.....	2	11	14
Megrim.....								27	27
Epilepsy.....		2	.....	2	.....	.....	.....	5	7
Chorea.....		1	.....	1	.....	.....	.....	.....	1
Hypochondriasis.....								1	1
DISEASES OF THE EYE.....									
Conjunctivitis:		27	11	10	3	.....	3	149	176
Catarrhal.....		6	5	.....	1	.....	.....	86	92
Purulent.....								2	2
Chronic.....								2	2
Granular.....		4	1	2	1	.....	.....	11	15
Pterygium.....		1	.....	.....	1	.....	.....	3	4
Keratitis.....		4	1	2	.....	.....	1	4	8
Ulcer of cornea.....		3	2	1	.....	.....	.....	4	7
Opacity of cornea.....		1	.....	1	.....	.....	.....	.....	1
Iritis.....		2	2	.....	.....	.....	.....	6	8
Mydriasis.....								3	3
Atrophy of optic disc.....		1	.....	.....	.....	.....	1	1	2
Retinitis.....								1	1
Dacryocystitis.....		2	.....	2	.....	.....	.....	2	4
Epiphora.....				1	.....	.....	.....	1	1
Hæmatoma.....				1	.....	.....	.....	1	1
Emphysema of eyelid.....				1	.....	.....	.....	1	1
Blepharitis.....		1	.....	.....	.....	.....	1	5	6
Stye.....								9	9
Trichiasis.....								6	6
Entropion.....		2	.....	2	.....	.....	.....	.....	2
Ptosis.....								1	1
DISEASES OF THE EAR.....									
Inflammation of the external meatus, acute.....		5	3	2	.....	.....	.....	44	49
Abscess of the external meatus.....		2	2	.....	.....	.....	.....	1	1
Accumulation of wax.....								3	5
Inflammation of the middle ear.....		3	1	2	.....	.....	.....	13	13
Obstruction of Eustachian tube.....								25	28
Deafness.....								1	1
DISEASES OF THE NOSE.....									
Epistaxis.....	1	1	.....	1	.....	.....	1	118	120
Inflammation.....								1	1
Nasal catarrh.....	1	1	.....	1	.....	.....	1	111	113
Ulceration.....								5	5
DISEASES OF THE CIRCULATORY SYSTEM.....									
Pericarditis.....	5	59	8	43	3	4	6	107	171
Endocarditis.....		4	2	1	.....	.....	1	1	5
Valvular disease:									
Aortic.....		7	.....	5	.....	2	.....	21	28
Mitral.....	3	26	1	22	2	1	3	37	66
Tricuspid.....		1	.....	1	.....	.....	.....	.....	1
Hypertrophy of heart.....		2	.....	1	1	.....	.....	3	5
Degeneration of heart, fatty.....		1	.....	1	.....	.....	.....	2	3
Dilatation of heart.....		1	.....	1	.....	.....	.....	1	2

TABLE VII.—*Tabular statement, by districts, of diseases and injuries, etc.—Continued.*

THE GREAT LAKES.

DISEASES.	NUMBER OF CASES.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Total treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases.									
DISEASES OF THE CIRCULATORY SYSTEM—Continued.									
Angina pectoris.....		2	2					1	3
Palpitation and irregular action of heart.....		5	2	3				13	18
Aneurism of arteries.....	2	3		3		1	1	6	11
Phlebitis.....		1		1					1
Varix.....		6	1	4			1	21	27
DISEASES OF THE RESPIRATORY SYSTEM....									
Laryngitis:	8	191	100	66	8	13	12	1,174	1,373
Acute.....		2	1	1				74	76
Chronic.....		2		2				2	4
Catarrhal.....								2	2
Bronchitis:									
Acute.....	2	70	55	12	2	1	2	798	870
Chronic.....		22	7	12			3	95	117
Catarrhal.....		3	1	1	1			105	108
Spasmodic asthma.....		12	2	7	2		1	25	37
Hæmoptysis.....		1		1				1	2
Pneumonia.....	3	40	27	7		8	1	10	53
Abscess of lung.....								1	1
Cirrhosis of lung.....		2		1			1	3	5
Pneumonic phthisis:									
Acute.....		3		1	1	1			3
Chronic.....	1	21	1	14	2	2	3	25	47
Emphysema.....	1	4		4		1		10	15
Hydrothorax.....		1		1				1	2
Pleurisy:									
Acute.....	1	7	6	1			1	17	25
Chronic.....								3	3
Empyema.....		1		1				2	3
DISEASES OF THE DIGESTIVE SYSTEM.....									
Ulcer of the lips.....	4	164	118	33	7	4	6	1,493	1,661
Stomatitis.....								4	4
Ulcerative stomatitis.....		2	2					7	9
Abscess of the antrum.....								16	16
Ulceration of the dental pulp.....	1			1					1
Caries of dentine and cementum.....								2	2
Abscess of dental periosteum.....								18	18
Toothache.....								2	2
Hypertrophy of tonsils.....								19	19
Elongated uvula.....		1					1	1	2
Sore throat.....								3	3
Quinsy.....		3	3					63	66
Follicular tonsillitis.....		4	4					16	20
Ulceration of fauces.....		10	8				2	35	45
Abscess of salivary glands.....								16	16
Cyst of salivary glands.....								1	1
Salivation.....		1				1		1	2
Follicular inflammation of the pharynx.....		3	2	1				66	69
Post-pharyngeal abscess.....								2	2
Ulceration of pharynx.....								1	1
Inflammation of the stomach.....		4	1	2			1	16	20
Ulceration of the stomach.....		2		1	1			2	4
Dilatation of the stomach.....								3	3
Dyspepsia.....		18	8	8	2			313	331
Gastrodynia.....								6	6
Vomiting.....								9	9
Enteritis.....	1	1	1	1				1	3
Typhlitis.....		1	1						1
Colitis.....		1	1						2
Obstruction of the intestines.....		1	1					1	1
Hernia.....	1	12	6	5	2			105	118
Tænia solium.....		4	3				1	6	10
Diarrhœa.....		37	34	2	1			218	255
Constipation.....		6	6					396	402

TABLE VII.—*Tabular statement, by districts, of diseases and injuries, etc.—Continued.*

THE GREAT LAKES.

DISEASES.	NUMBER OF CASES.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Total treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases.									
DISEASES OF THE DIGESTIVE SYSTEM—Cont'd.									
Colic		4	4					33	37
Abscess of the rectum		2	2					2	2
Ulceration of the rectum		2	1			1		3	5
Piles:									
Internal		10	7	3				22	32
External		7	3	3	1			51	58
Stricture of the rectum	1			1					1
Fistula in ano		5	4	1				6	11
Pruritus ani								5	5
Hypertrophy of the liver								1	1
Congestion of the liver		4	4					6	10
Hepatitis		5	4			1			5
Cirrhosis of liver		2		1			1	3	5
Lardaceous liver		1		1				1	2
Jaundice		3	2	1				5	8
Inflammation of hepatic ducts and gall-bladder		1	1					1	2
Biliary colic		3	3			1		5	8
Peritonitis		4	2	1				1	5
DISEASES OF THE LYMPHATIC SYSTEM.....	7	103	77	27	2		4	191	301
Induration and enlargement of the spleen	1		1						1
Splenitis		1	1					2	2
Inflammation of lymph-vessels								2	2
Inflammation of lymph-glands	5	43	34	12	2			117	165
Suppuration of lymph-glands	1	58	40	15			4	70	129
Lymphadenoma		1	1					2	3
DISEASES OF THE THYROID BODY									
Inflammation								1	1
DISEASES OF THE URINARY SYSTEM.....	5	32	8	19	1	4	5	120	157
Acute nephritis	2	5	4	2		1		13	20
Bright's disease	1	16	1	10		3	3	9	26
Abscess of kidney		1					1		1
Diabetes insipidus		1	1					2	3
Hæmaturia		1	1					5	6
Lithuria								1	1
Inflammation of bladder:									
Acute		3		2	1			16	19
Sub-acute								2	2
Chronic	2	5	1	5			1	42	49
Irritability of bladder								23	23
Retention of urine								5	5
Incontinence of urine								2	2
DISEASES OF THE GENERATIVE SYSTEM...	9	146	106	34	4	1	10	605	760
Urethritis		1	1					11	12
Gleet								155	155
Lacunar abscess		1	1						1
Stricture of urethra:									
Organic	3	44	23	19	1	1	3	90	137
Spasmodic								1	1
Hypertrophy of prostate gland		1	1					6	7
Acute inflammation of prostate gland		1	1					2	3
Abscess of prostate gland								1	1
Œdema of the penis								1	1
Inflammation of glans penis		5	4	1				23	28
Abscess of penis								1	1
Ulcer of penis	2	36	32	3	1		2	162	200
Phimosis		4	4					10	14
Paraphimosis	1	1	2					5	7
Chordee								3	3
Inflammation of the scrotum								1	1
Abscess of the scrotum		1	1					1	2

TABLE VII.—*Tabular statement, by districts, of diseases and injuries, etc.*—Continued.

THE GREAT LAKES.

DISEASES.	NUMBER OF CASES.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Total treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases.									
DISEASES OF THE GENERATIVE SYSTEM—Continued.									
Sloughing of scrotum		1	1						1
Hydrocele of spermatic cord		1		1					1
Varicocele		3	3					13	16
Hæmatocele of tunica vaginalis.....								1	1
Hydrocele of tunica vaginalis.....	1	3	3	1				3	7
Atrophy of testicle								1	1
Oorchitis:									
Acute	1	17	12	3			3	43	61
Chronic		4	1	2	1			4	8
Epididymitis		15	11		1		2	26	41
Spermatorrhœa								19	19
Impotence								9	9
Inflammation of ovary.....		1	1					2	3
Pelvic cellulitis		1	1					1	1
Hæmorrhage of the uterus								1	1
Inflammation of the uterus								1	1
Cataract of the uterus		2	1	1				1	3
Ulcer of labia								1	1
Prolapse of vagina		1		1					1
Inflammation of vulva								1	1
Amenorrhœa.....	1			1				1	2
Dysmenorrhœa.....								1	1
Menorrhagia		1	1					1	1
Leucorrhœa								3	3
Pregnancy		1	1					1	2
DISEASES OF THE ORGANS OF LOCOMOTION . .	6	39	26	13	1	2	3	50	95
Periostitis								8	8
Perichondritis								2	2
Caries	2	3	4	1				4	9
Necrosis	1	8	4	4		1		4	13
Ununited fracture or false joint.....	2	1	2		1			1	4
Dropsy of joints		1				1			1
Synovitis:									
Acute		11	7	3			1	11	22
Chronic	1	4	2	2			1	7	12
Ankylosis		1	1					1	2
Curvature of spine.....		2		2					2
Hypertrophy of muscles.....								1	1
Inflammation of muscles		1		1				3	4
(yst of muscles								2	2
Inflammation of tendons		1	1					4	5
Adhesion of tendons		1	1				1	1	2
Contraction of tendons		1	1						1
Inflamed bursa		3	3						3
Bursal abscess		1	1						1
Bunion								1	1
DISEASES OF THE CONNECTIVE TISSUE	3	33	29	4	1		2	56	92
Oedema								2	2
Inflammation	2	5	6		1			12	19
Abscess	1	28	23	4			2	42	71
DISEASES OF THE SKIN.....	7	95	78	16	5		3	499	601
Erythema		1	1					4	5
Urticaria		1	1					32	33
Eczema		7	3	4				100	107
Pityriasis								1	1
Prurigo								2	2
Lichen								3	3
Psoriasis		3	1	1	1			15	18
Herpes								8	8
Zona		1	1					2	3
Pemphigus								1	1
Acne.....								21	21

TABLE VII.—*Tabular statement, by districts, of diseases and injuries, etc.*—Continued.

THE GREAT LAKES.

DISEASES.	NUMBER OF CASES.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Total treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases.									
DISEASES OF THE SKIN—Continued.									
Sycosis		1		1				5	6
Alopecia								1	1
Frostbite		3	1	2				4	7
Ulcer	4	54	48	8	1		1	100	158
Fissures								2	2
Boil		3	3					61	64
Carbuncle	1	5	6					4	10
Whitlow	2	9	8		1		2	24	35
Onychia								2	2
Corn								8	8
Lupus		1	1						1
Wen		2	2					6	8
Pruritus								1	1
Hyperidrosis								1	1
Ringworm								13	13
Itch		2	2					64	66
Phthiriasis								14	14
Malingery		1			1				1
Undetermined		1			1				1
Poisons		4	3	1				7	11
Lead		2	2					1	3
Alcohol		1		1				2	3
Belladonna		1	1						1
Tobacco								4	4
Injuries	35	463	367	81	5	11	34	710	1,208
GENERAL INJURIES	1	33	23	5		5	1	66	100
Burns and scalds	1	28	22	3		3	1	36	65
Effects of cold		2	1			1		25	27
Effects of irritants and corrosives								1	1
Sunstroke								2	2
Multiple injury		3		2		1		1	4
Exhaustion								1	1
LOCAL INJURIES	34	430	344	76	5	6	33	644	1,108
Strain of muscles		3	2	1				43	46
Rupture of muscles		1	1						1
Strain of tendon								1	1
Rupture of tendon	1		1					3	4
Abrasion of the skin								7	7
Contusion of scalp		2	1	1				2	4
Scalp wound:									
Bone not exposed		14	13	1				16	30
Bone exposed		6	3	2	1			5	11
Fracture of the base of the skull								1	1
Concussion of brain	2	3	2	1		1	1		5
Contusion of face	1	7	8					9	17
Wound of face		15	13	1			1	9	24
Fracture of facial bones		12	7	2		1	2	2	14
Contusion of the eye		2	2					3	5
Foreign body in cornea or conjunctiva		1	1					18	19
Wound of eyelid		2	2					2	4
Wound of cornea		2		2				1	3
Wound of iris		1		1					1
Contusion of pinna		1	1						1
Wound of pinna									1
Rupture of membrana tympani								1	1
Contusion of soft parts of neck		1	1					1	2
Wound of neck								1	1
Fracture of hyoid bone		1		1					1
Foreign body in the pharynx									1
Contusion of the chest	2	25	20	3	1		3	36	63
Fracture of the ribs	3	21	14	7		2	1	11	35

TABLE VII.—*Tabular statement, by districts, of diseases and injuries, etc.—Continued.*

THE GREAT LAKES.

DISEASES.	NUMBER OF CASES.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Total treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Injuries.									
LOCAL INJURIES—Continued.									
Wound of parietes of chest		4	3	1				4	8
Penetrating wound of chest	1	1	2						2
Penetrating wound of pleura or lung		1		1				1	2
Contusion of back		18	15	2			1	10	28
Sprain of back	2	13	11	4				12	27
Wound of back	1	4	3	1			1	1	6
Fracture of spine		1					1		1
Concussion of cord								1	1
Contusion of abdomen		3	2				1	3	6
Contusion of pelvis								2	2
Wound of organs of generation		2	1	1				1	3
Fracture and dislocation of pelvis		1				1			1
Contusion of testicle								2	2
Contusion of upper extremities	1	20	17	1	1		2	96	117
Sprain of the shoulder		2	1	1				3	5
Sprain of the elbow	1		1					7	8
Sprain of the wrist		5	5					18	23
Sprain of the fingers								3	3
Wound of the upper extremities	1	42	36	5	1		1	108	151
Fracture of the clavicle		3	3					3	6
Fracture of the scapula		1	1						1
Fracture of the humerus	3	3	4	2				2	8
Fracture of the radius	2	8	8	2				4	14
Fracture of the ulna		3	2	1					3
Fracture of both bones of forearm	2	3	4	1				2	7
Fracture of carpus, metacarpus, and phalanges	1	8	7	2				11	20
Dislocation of the clavicle		2	2						2
Dislocation of the humerus		10	7	3				1	11
Dislocation of the radius		1	1						1
Dislocation of the metacarpus		1	1						1
Dislocation of the phalanges of thumb	1	1	1				1		2
Dislocation of the phalanges of fingers								6	6
Contusion of the lower extremities	5	43	36	7			5	69	117
Sprain of the hip		1	1					2	3
Sprain of the knee		6	3	3				10	16
Sprain of the ankle	1	36	23	5			3	35	66
Sprain of the foot		2	2					2	4
Wound of the lower extremities		34	29	1			4	41	75
Wound of joint, lower extremities		2	1				1		2
Fracture of femur		6	3	2		1			6
Fracture of leg, both bones	1	10	7	1	1		2		13
Fracture of tibia alone		1		1				2	3
Fracture of fibula alone	1	8	6	3				5	14
Fracture of tarsus		2	1	1					2
Fracture of metatarsus		2	1	1				1	3
Fracture of phalanges of toes	1		1						1
Dislocation of the patella		1					1		1
Dislocation of the astragalus		1					1		1
AMPUTATIONS		3	3					3	6
Amputation of fingers		3	3					2	5
Amputation of toes								1	1

THE PACIFIC.

TOTAL CASES	100	1,440	827	502	25	65	121	2,351	3,891
General Diseases	31	508	3	190	9	24	43	909	1,448
Small-pox		3	3						3
Measles	1		1						1
Dengue		1		1					1

TABLE VII.—*Tabular statement, by districts, of diseases and injuries, etc.—Continued.*

THE PACIFIC.

DISEASES.	NUMBER OF CASES.								
	Remaining under treatment from previous years.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Total treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
General Diseases.									
Mumps		1	1					4	5
Simple continued fever		1	1					1	2
Enteric fever	2	48	41			3	6	1	51
Cholera, sporadic		1	1					5	6
Dysentery		4	3	1				14	18
Malarial intermittent fever		41	32	9				67	108
Malarial remittent fever		13	12	1				3	16
Malarial cachexia	1	5	2	4				8	14
Erysipelas, simple		9	7	2				4	13
Pyæmia		1	1						1
Syphilis:									
Primary		15	8	5			2	19	34
Secondary	3	51	2	44	1		7	152	206
Gonorrhœa	3	44	31	14			2	316	363
Effects of excessive venery								2	2
Scurvy	1	13	5	9				4	18
Alcoholism		15	14			1		10	25
Effects of heat		1	1						1
Debility	1	16	7	6	1		3	17	34
Rheumatic fever	5	31	30	3			3		36
Rheumatism	7	98	62	35		1	7	169	274
Gout								1	1
Osteo-arthritis	1	1		1			1		2
Fibroma		2	2					5	7
Lipoma		1	1						1
Chondroma								1	1
Angelioma		1	1						1
Warts		2	2					3	5
Condyloma								6	6
Carcinoma		4		2	1	1		1	5
Epithelioma		1				1			1
Scirrhus	1	2		1		2			3
Tubercle of lung and other organs	4	77		49	6	15	11	91	172
Scrofula	1	5	2	3			1	2	8
Anæmia								3	3
Local Diseases	42	644	332	253	11	36	54	1,150	1,836
DISEASES OF THE NERVOUS SYSTEM.									
Congestion of spinal cord		1					1		1
Hemorrhage of dura mater		1				1		1	2
Hemorrhage of cerebrum	1	3		4					4
Inflammation:									
Of membrane of brains and spinal cord		1					1		1
Of cerebral membranes		2	1	1					2
Neuritis		2	2						2
Sclerosis		1		1					1
Locomotor ataxy		1					1		1
Apoplexy		1	1						1
Paralysis								1	1
Hemiplegia	4	9		9		1	3	2	15
Local paralysis		7		5	1		1	3	10
Spasm of muscle								1	1
Wry-neck		1	1					1	2
Neuralgia		15	10	3			2	39	54
Facial		2	2					7	9
Sciatica		13	8	4		1		11	24
Vertigo		1	1						1
Migrain		1	1						1
Epilepsy								3	3
Hypochondriasis		1		1				1	2
Insanity		2	1		1			1	3
Mania		1			1			1	2
DISEASES OF THE EYE		21	11	9			1	29	50

TABLE VII.—*Tabular statement, by districts, of diseases and injuries, etc.*—Continued.

THE PACIFIC.

DISEASES.	NUMBER OF CASES.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Total treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases.									
DISEASES OF THE EYE—Continued.									
Conjunctivitis:									
Catarhal		6	6					18	24
Granular		1		1					1
Keratitis		2	2						2
Ulcer of cornea		3	1	2				3	6
Opacity of cornea		2		2					2
Iritis		4	2	1			1	3	7
Inflammation of optic nerve		1		1					1
Hypermetropia								1	1
Night-blindness		1		1				1	2
Stricture of nasal duct								2	2
Stye								1	1
Chalazion		1		1					1
DISEASES OF THE EAR		3	1	2				18	21
Inflammation of the external meatus:									
<i>a.</i> Acute								1	1
<i>b.</i> Chronic		1		1				3	4
Abscess of the external meatus								2	2
Accumulation of wax								2	2
Inflammation of the middle ear		2	1	1				9	11
Perforation of membrana tympani								1	1
DISEASES OF THE NOSE		4	2	2				17	21
Epistaxis		1	1						1
Inflammation								5	5
Nasal catarrh		3	1	2				11	14
Ozena								1	1
DISEASES OF THE CIRCULATORY SYSTEM	2	34		19	3	8	6	24	60
Pericarditis								3	3
Endocarditis		1		1					1
Valvular disease:									
Aortic	1	12		6	1	5	1	6	19
Mitral		7		4	1		2	6	13
Hypertrophy of heart		1		1					1
Degeneration of heart, fatty		2		1		1		2	4
Dilatation of heart		1				1			1
Cyanosis		1					1		1
Palpitation and irregular action of heart		1		1				4	5
Arteritis		1		1					1
Degeneration of arteries		2		1		1		1	3
Aneurism of arteries	1	4		3			2		5
Varix		1			1			2	3
DISEASES OF THE RESPIRATORY SYSTEM	7	114	37	60	2	12	19	247	368
Laryngitis:									
Acute								6	6
Chronic								3	3
Bronchitis:									
Acute	2	26	13	15				134	162
Chronic		4	1	3				55	59
Catarrhal		6	3	3				9	15
Spasmodic asthma		3		1			2	2	5
Passive congestion of lung		1		1					1
Hæmoptysis								5	5
Pneumonia	1	10	6	2		3		1	12
Abscess of lung		2		1			1		2
Pneumonic phthisis:									
Acute		1				1			1
Chronic	3	33		26	1	4	5	15	51
Emphysema		1		1				2	3
Pleurisy:									
Acute		20	14	2		2	2	10	30
Chronic		6		5	1			5	11
Empyema	1	1				2			2

TABLE VII.—*Tabular statement, by districts, of diseases and injuries, etc.*—Continued.

THE PACIFIC.									
NUMBER OF CASES.									
DISEASES.	Remaining under treatment previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Total treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases.									
DISEASES OF THE DIGESTIVE SYSTEM.....	8	105	66	35	1	6	5	244	357
Ulcer of the lips.....		1		1				1	2
Stomatitis.....		1		1					1
Ulcerative stomatitis.....								2	2
Caries of dentine and cementum.....								10	10
Abscess of dental periosteum.....		2	2					4	6
Ulceration of gums and alveoli.....								1	1
Toothache.....								1	1
Hypertrophy of tonsils.....								1	1
Sore throat.....		6	3	3				20	26
Quinsy.....		6	4	1			1	8	14
Follicular tonsillitis.....		5	1	3			1	8	13
Ulceration of fauces.....		2	1	1				3	5
Salivation.....								1	1
Follicular inflammation of the pharynx.....		4	1	2			1	15	19
Inflammation of the stomach.....	2	15	14	2			1	17	34
Ulceration of the stomach.....								3	3
Dyspepsia.....		4		4				41	45
Catarrhal inflammation of the intestines.....	2	12	12	1			1	12	26
Colitis.....		5	4	1				2	7
Ulcer of the intestines.....		1				1			1
Obstruction of the intestines.....		1		1					1
Hernia.....		1		1				37	38
Tænia solium.....		2	2					1	3
Tænia mediocanellata.....		4	4					4	4
Diarrhœa.....		5	4	1				18	23
Constipation.....		3	2	1				14	17
Colic.....				1				3	3
Piles:									
Internal.....		3		3				2	5
External.....		3	2	1				8	11
Fistula in ano.....		4	2	1	1			2	6
Fissure of the anus.....		3		3					3
Pruritus ani.....								2	2
Congestion of the liver.....	1	5	4	2				3	9
Hepatitis.....		1	1					2	3
Cirrhosis of liver.....	2	1				3			3
Abscess of liver.....		3	1			2			3
Jaundice.....								1	1
Gallstones.....		1		1					1
Peritonitis.....	1		1					1	2
Adhesion of peritonæum.....		1	1						1
DISEASES OF THE LYMPHATIC SYSTEM.....	2	43	22	23				38	83
Congestion of the spleen.....	1			1				1	1
Hypertrophy of lymph-glands.....		2	1	1				11	13
Inflammation of lymph-glands.....	1	21	13	9				12	34
Suppuration of lymph-glands.....		20	8	12				15	35
DISEASES OF THE URINARY SYSTEM.....	4	25	10	10	1	3	5	39	68
Acute nephritis.....		3	1	1		1		3	6
Bright's disease.....	2	7		5	1	2	1	12	21
Diabetes insipidus.....		1		1					1
Hæmaturia.....		2	1	1					2
Hæmorrhage of bladder.....		1					1		1
Inflammation of bladder:									
Acute.....		6	4				2	3	9
Sub-acute.....	2	1	3					8	11
Chronic.....		3	1	1			1	6	9
Irritability of bladder.....		1		1				6	7
Retention of urine.....								1	1
DISEASES OF THE GENERATIVE SYSTEM.....	5	103	64	35	1	1	7	219	327
Urethritis.....								4	4
Gleet.....								11	11
Stricture of urethra, organic.....	2	27	8	17	1	1	2	70	99
Acute inflammation of prostate gland.....								1	1

TABLE VII—*Tabular statement, by districts, of diseases and injuries, etc.*—Continued.

THE PACIFIC.

NUMBER OF CASES.									
DISEASES.	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Total treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases.									
DISEASES OF THE GENERATIVE SYSTEM—									
Continued.									
(Edema of the penis								1	1
Inflammation of glans penis								3	3
Ulcer of penis	2	41	30	10			3	102	145
Phimosis		2	2						2
Paraphimosis		1		1				2	3
Abscess of the scrotum		3		3					3
Hydrocele of spermatic cord		1		1				1	2
Inflammation of spermatic cord								1	1
Varicocele		2	2						2
Hydrocele of tunica vaginalis		5	3	2				2	7
Orchitis:									
Acute	1	9	8	1			1	3	13
Chronic								4	4
Epididymitis		11	10				1	3	14
Abscess of testicle		1	1					3	4
Spermatorrhœa								6	6
Inflammation of male breast								2	2
DISEASES OF THE ORGANS OF LOCOMOTION.									
Periostitis	4	32	21	7		2	6	18	54
Caries		1		1				2	3
Necrosis		4	2	2					4
Dropsy of joints		6	3	1			2	1	7
Synovitis:		6	4	1			1	4	10
Acute		8	8					1	9
Chronic	1	1	1				1	1	3
Ankylosis		2		1			1	3	5
Degeneration of cartilages	1						1		1
Caries and necrosis of spine		1							1
Lateral curvature of spine	2		1			1			2
Inflammation of tendons		1	1					3	4
Inflamed bursa		2	1	1				2	4
Bursal tumor								1	1
DISEASES OF THE CONNECTIVE TISSUE.									
(Edema		35	23	9		1	2	34	69
Inflammation		1	1					2	3
Abscess		4	3	1				10	14
		30	19	8		1	2	22	52
DISEASES OF THE SKIN.									
Erythema	5	59	47	14			3	151	215
Rosacea								1	1
Urticaria								1	1
Eczema			5	4				6	6
Impetigo		1		1			1	20	25
Prurigo								1	1
Psoriasis	1	1	1	1				5	7
Herpes								7	7
Zona		1	1					3	4
Gutta serena								2	2
Sycosis								1	1
Stearorrhœa								1	1
Ulcer	3	31	22	11			1	46	80
Cicatrices								3	3
Boil	1	6	6	1				18	25
Carbuncle		5	5					9	14
Whitlow		5	4				1	5	10
Onychia		3	3					2	5
Corn								1	1
Lupus								1	1
Cheloid		1	1					1	2
Wen								1	1
Bromidrosis								1	1
Ringworm								3	3
Tinea versicolor								1	1

TABLE VII.—*Tabular statement, by districts, of diseases and injuries, etc.*—Continued.

THE PACIFIC.

DISEASES.	NUMBER OF CASES.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Total treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases.									
DISEASES OF THE SKIN—Continued.									
Itch								9	9
Undetermined								2	2
Poisons		7	6				1	1	8
Lead		1	1						1
Mercury		1	1						1
Alcohol		5	4				1	1	6
Injuries	26	281	215	59	5	5	23	291	505
GENERAL INJURIES.		12	8	2			2	36	48
Burns and scalds		3	2	1				12	15
Effects of cold		3	3					21	24
Multiple injury		5	2	1			2	2	7
Asphyxia		1	1						1
Exhaustion								1	1
LOCAL INJURIES.	26	269	207	57	5	5	21	255	550
Strain of muscles		2	2					5	7
Rupture of muscles								2	2
Rupture of tendon								1	1
Foreign body in subcutaneous tissue								1	1
Contusion of scalp		1					1	1	2
Scalp wound:									
Bone not exposed		5	5					10	15
Bone exposed		3	1	1		1		3	6
Fracture of the vault of the skull	1	1		1		1			2
Fracture of the base of the skull		1				1			1
Concussion of brain	1	2	2			1			3
Contusion of face		1	1						1
Wound of face	1	4	3	1			1	11	16
Fracture of facial bones		4	3	1				1	5
Contusion of the eye		1	1					1	2
Foreign body in cornea or conjunctiva								1	1
Wound of sclerotic								1	1
Wound of cornea		1	1						1
Wound of pinna		1		1				1	2
Foreign body in external meatus								1	1
Contusion of the chest		4	2	2				6	10
Fracture of the ribs		17	9	6	1		1	5	22
Wound of parietes of chest		1	1					1	2
Perforating wound of chest	1	1	1	1				1	3
Contusion of back	2	18	16	4				13	33
Sprain of back		12	11	1				2	14
Wound of back								3	3
Wound of spine								1	1
Concussion of cord		2	1	1					2
Contusion of abdomen		2	1				1	1	3
Wound of parietes of abdomen		2	2						2
Contusion of upper extremities		13	12	1				23	36
Sprain of the shoulder								4	4
Sprain of the elbow		1					1	2	3
Sprain of the wrist	1	1	2					3	5
Sprain of the fingers								1	1
Wound of the upper extremities	3	29	22	6			4	61	93
Fracture of the clavicle		1	1					2	3
Fracture of the scapula		1	1						1
Fracture of the humerus	1	2	1	2					3
Fracture of the radius		3	1	2				2	5
Fracture of the ulna		1	1					1	2
Fracture of both bones of forearm	1	2	3						3
Fracture of carpus, metacarpus, and phalanges	2	5	4	3				6	13
Dislocation of the clavicle		2	1	1					2
Dislocation of the humerus		5	3	1			1	2	7

TABLE VII.—*Tabular statement, by districts, of diseases and injuries, etc.*—Continued.

QUARANTINE.

DISEASES.	NUMBER OF CASES.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Total treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases.									
DISEASES OF THE RESPIRATORY SYSTEM.---	----	2	----	2	----	----	----	3	5
Bronchitis:									
Acute	-----	1	-----	1	-----	-----	-----	-----	1
Chronic	-----		-----		-----	-----	-----	3	3
Emphysema	-----	1	-----	1	-----	-----	-----	-----	1
DISEASES OF THE DIGESTIVE SYSTEM.---	----	3	2	----	----	----	1	30	33
Caries of dentine and cementum	-----							2	2
Toothache	-----							4	4
Follicular tonsillitis	-----	1	1	-----	-----	-----	-----	2	3
Inflammation of the stomach	-----							2	2
Dyspepsia	-----							4	4
Gastrodynia	-----							1	1
Enteritis	-----	1					1	1	2
Hernia	-----							1	1
Diarrhæa	-----	1	1	-----	-----	-----	-----	11	12
Abscess of the rectum	-----							1	1
Congestion of the liver	-----							1	1
DISEASES OF THE LYMPHATIC SYSTEM.---	----	2	1	1	----	----		1	3
Inflammation of lymph-glands	-----	2	1	1	-----	-----	-----	1	3
DISEASES OF THE GENERATIVE SYSTEM.---	----	1	----	1	----	----		2	3
Ulcer of penis	-----							1	1
Orchitis, acute	-----	1	----	1	-----	-----	-----	1	2
DISEASES OF THE CONNECTIVE TISSUE.---	----	1	----	1	----	----			1
Abscess	-----	1	----	1	-----	-----	-----	-----	1
DISEASES OF THE SKIN.	-----	1	1	-----	-----	-----		5	6
Eczema	-----							2	2
Ulcer	-----							2	2
Boil	-----	1	1	-----	-----	-----	-----	-----	1
Corn	-----							1	1
Injuries	-----	1	4	2	3	-----	-----	11	16
GENERAL INJURIES.	-----		1	1	1	-----	-----	-----	2
Heat apoplexy	-----		1	1	-----	-----	-----	-----	1
Multiple injury	-----	1	-----	----	1	-----	-----	-----	1
LOCAL INJURIES.	-----		3	1	2	-----	-----	11	14
Concussion of brain	-----		1	1	-----	-----	-----	-----	1
Contusion of upper extremities	-----							3	3
Sprain of the wrist	-----							2	2
Wound of the upper extremities	-----							2	2
Fracture of carpus, metacarpus, and phalanges	-----		1	----	1	-----	-----	-----	1
Contusion of the lower extremities	-----		1	----	1	-----	-----	1	2
Wound of the lower extremities	-----							2	2
Fracture of phalanges of toes	-----							1	1

TABLE VIII.—TABULAR STATEMENT, BY DISTRICTS, OF CAUSES OF MORTALITY AMONG PATIENTS OF THE SERVICE DURING THE YEAR ENDED JULY 30, 1889.

CAUSES OF DEATH.	DISTRICTS.									
	Total.	North Atlantic.	Middle Atlantic.	South Atlantic.	The Gulf.	The Ohio.	The Mississippi.	The Great Lakes.	The Pacific.	Quarantine stations.
Total Deaths from all Causes	475	52	65	69	52	47	45	76	65	4
FROM DISEASE.....	436	46	61	63	52	44	41	65	60	4
FROM POISONS.....	1			1						
FROM INJURY.....	38	6	4	5		3	4	11	5	
General Diseases	216	21	25	32	27	30	20	33	24	4
Enteric fever.....	30	5	3	2	1	5		10	3	1
Typho-malarial fever.....	1	1								
Yellow fever.....	2									2
Dysentery.....	6	1			1		4			
Malarial intermittent fever.....	17	2	2	2	2	3	5	1		
Malarial remittent fever.....	11	4	1	1	3		1			1
Malarial cachexia.....	2	1		1						
Erysipelas, simple.....	1							1		
Septicæmia.....	2					2				
Syphilis, secondary.....	10		2	1	1		1	5		
Scurvy.....	1		1							
Alcoholism.....	4		1		1	1			1	
Delirium tremens.....	1							1		
Debility.....	1				1					
Rheumatic fever.....	6	1	1	1		1	2			
Rheumatism.....	9			5	1	2			1	
Malignant new-growth.....	1							1		
Angioma.....	1						1			
Carcinoma.....	4					2		1	1	
Epithelioma.....	1								1	
Scirrhus.....	2								2	
Tubercle of lung and other organs.....	99	6	13	18	16	13	6	12	15	
Acute miliary tuberculosis.....	1		1							
Purpura.....	1			1						
Anæmia.....	1							1		
Diabetes mellitus.....	1					1				
Local Diseases	220	25	36	31	25	14	21	32	36	
DISEASES OF THE NERVOUS SYSTEM.....	27	3	4	6	4	2	1	4	3	
Hæmorrhage of dura mater.....	1								1	
Hæmorrhage of the cerebrum.....	4	1	2		1				1	
Inflammation:										
Of membranes of brain and spinal cord.....	1				1					
Of cerebral membranes.....	2							2		
Myelitis.....	1			1						
Sclerosis.....	1					1				
Apoplexy.....	1	1								
Hemiplegia.....	7	1	1	2				2	1	
Paraplegia.....	2		1				1			
Neuralgia.....	1					1				
Sciatica.....	1								1	
Tetanus.....	1			1						
Insanity.....	1				1					
Melancholia.....	1			1						
General paralysis of the insane.....	2			1	1					
DISEASES OF THE EAR	1			1						
Inflammation of the middle ear.....	1			1						
DISEASES OF THE CIRCULATORY SYSTEM.....	36	3	5	4	6	1	5	4	8	
Endocarditis.....	1						1			
Valvular disease:										
Aortic.....	12		2		3			2	5	
Mitral.....	15	2	1	3	3	1	4	1		
Hypertrophy of the heart.....	1		1							
Degeneration of heart, fatty.....	1								1	
Dilatation of heart.....	2			1					1	

TABLE VIII.—*Tabular statement, by districts, of causes of mortality, etc.*—Continued.

CAUSES OF DEATH.	DISTRICTS.								
	Total.	North Atlantic.	Middle Atlantic.	South Atlantic.	The Gulf.	The Ohio.	The Mississippi.	The Great Lakes.	The Pacific. Quarantine sta- tions.
Local Diseases.									
DISEASES OF THE CIRCULATORY SYSTEM—Continued.									
Aneurism of heart.....	1	1							
Degeneration of arteries.....	1								1
Aneurism of arteries.....	2		1					1	
DISEASES OF THE RESPIRATORY SYSTEM.	82	7	14	10	8	7	11	13	12
Laryngitis, chronic.....	1				1				
Ulceration of larynx.....	1		1						
Bronchitis:									
Acute.....	6		1	4				1	
Chronic.....	2		1		1				
Spasmodic asthma.....	2	2							
Hæmoptysis of lung.....	2			2					
Pneumonia.....	37	2	6	3	3	5	7	8	3
Pneumonic phthisis:									
Acute.....	4	1	1					1	1
Chronic.....	18	2	3	1	2	2	2	2	4
Emphysema.....	1							1	
Pleurisy:									
Acute.....	4						2		2
Chronic.....	1				1				
Empyema.....	3		1						2
DISEASES OF THE DIGESTIVE SYSTEM.	35	7	6	3	2	4	3	4	6
Sore throat.....	1		1						
Salivation.....	1							1	
Inflammation of the stomach.....	5	2	1		1		1		
Dyspepsia.....	2	2							
Catarrhal inflammation of intestines.....	2					1	1		
Colitis.....	2	1				1			
Ulcer of the intestines.....	1								1
Hernia.....	1			1					
Diarrhœa.....	3			1		1	1		
Ulceration of the rectum.....	1							1	
Fistula in ano.....	1		1						
Hepatitis.....	2		1					1	
Cirrhosis of liver.....	5		1			1			3
Abscess of liver.....	4	1	1						2
Ascites.....	1			1					
Peritonitis.....	3	1			1			1	
DISEASES OF THE THYROID BODY.	1	1							
Goitre.....	1	1							
DISEASES OF THE URINARY SYSTEM.	22	1	6	4	3		1	4	3
Acute nephritis.....	5		1	2				1	1
Bright's disease.....	16	1	4	2	3		1	3	2
Abscess of kidney.....	1		1						
DISEASES OF THE GENERATIVE SYSTEM.	5			2	1			1	1
Stricture of urethra, organic.....	5			2	1			1	1
DISEASES OF THE ORGANS OF LOCOMOTION.	8	2		1	1			2	2
Periostitis.....	1	1							
Caries.....	1				1				
Necrosis.....	1				1				
Dropsy of joints.....	1							1	
Psoas abscess.....	2	1		1				1	
Caries and necrosis of spine.....	1								1
Lateral curvature of spine.....	1								1
DISEASES OF THE CONNECTIVE TISSUE.	1								1
Abscess.....	1								1
DISEASES OF THE SKIN.	2	1	1						
Ulcer.....	1		1						
Gangrene.....	1	1							

TABLE VIII.—*Tabular statement, by districts, of causes of mortality, etc.*—Continued.

CAUSES OF DEATH.	DISTRICTS.								
	Total.	North Atlantic.	Middle Atlantic.	South Atlantic.	The Gulf.	The Ohio.	The Mississippi.	The Great Lakes.	The Pacific. Quarantine stations.
Poisons	1			1					
Alcohol.....	1			1					
Injuries	38		4	5		3	4	11	5
GENERAL INJURIES	9	2	1			1		5	
Burns and scalds.....	3							3	
Effects of cold.....	1							1	
Sunstroke.....	1	1							
Multiple injury.....	3		1			1		1	
Asphyxia.....	1	1							
LOCAL INJURIES	29	4	3	5		2	4	6	5
Scalp wounds, bone exposed.....	2		1						1
Fracture of the vault of the skull.....	3	1				1			1
Fracture of the base of the skull.....	1								1
Concussion of brain.....	2							1	1
Contusion of face.....	1						1		
Wound of face and mouth.....	1					1			
Fracture of facial bones.....	1							1	
Fracture of the ribs.....	3			1				2	
Wound of parietes of chest.....	1						1		
Sprain of back.....	1						1		
Fracture of spine.....	1		1						
Concussion of cord.....	1		1						
Wound of parietes of abdomen.....	2			2					
Rupture of urethra.....	1	1							
Fracture and dislocation of pelvis.....	1							1	
Wound of upper extremities.....	1			1					
Fracture of both bones of forearm.....	1						1		
Fracture of femur.....	3	2						1	
Fracture of leg, both bones.....	1			1					
Dislocation of femur at hip.....	1								1

TABLE IX.—*RATIO OF DEATHS FROM SPECIFIC CAUSES.*

Deaths from—	Per 100 from all causes.	Deaths from—	Per 100 from all causes.
General diseases.....	45.47	Diseases of the digestive system.....	7.37
Diseases of the nervous system.....	5.69	Diseases of the urinary system.....	4.63
Diseases of the circulatory system.....	7.58	Injuries.....	8.00
Diseases of the respiratory system.....	17.26	From all other causes.....	4.00

TABLE X.—*RATIO OF DEATHS IN EACH DISTRICT.*

Districts.	Per 100 patients treated in hospital.	Districts.	Per 100 patients treated in hospital.
North Atlantic.....	3.25	The Mississippi.....	3.52
Middle Atlantic.....	3.92	The Great Lakes.....	2.93
South Atlantic.....	3.55	The Pacific.....	4.22
The Gulf.....	3.08	The quarantine stations.....	5.00
The Ohio.....	3.52		

TABLE XI.—COMPARATIVE EXHIBIT.—MORTALITY PER 100 PATIENTS TREATED IN HOSPITAL, BY DISTRICTS, 1880 TO 1889.

Districts.	General average.	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.
North Atlantic.....	3.30	2.19	2.84	4.00	3.50	3.59	3.95	3.09	3.04	3.53	3.25
Middle Atlantic.....	4.00	4.88	3.63	3.92	3.54	3.87	3.34	3.27	4.85	4.80	3.92
South Atlantic.....	3.22	2.89	3.22	3.05	3.97	2.86	3.05	3.54	3.53	2.54	3.55
The Gulf.....	3.45	2.90	3.94	4.98	3.49	4.10	2.49	2.96	3.82	2.78	3.08
The Ohio.....	3.76	3.69	4.38	5.64	5.50	4.33	2.43	3.05	3.06	2.01	3.52
The Mississippi.....	3.63	2.84	3.29	3.51	4.35	4.08	2.93	2.79	4.19	4.78	3.52
The Great Lakes.....	2.69	2.01	3.16	2.49	2.51	3.07	2.79	2.37	2.72	2.83	2.93
The Pacific.....	4.51	4.56	6.09	3.35	3.96	4.88	3.30	5.72	4.59	4.45	4.22

TABLE XII.—COMPARATIVE EXHIBIT.—RATIO OF DEATHS FROM SPECIFIC CAUSES, 1880-1889.

Deaths from—	General average.	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.
General diseases	47.66	47.35	46.15	51.75	50.00	48.67	46.61	48.40	45.63	46.58	45.47
Diseases of the—											
Nervous system	5.94	5.02	7.25	5.57	6.77	4.49	8.07	4.91	4.79	6.84	5.69
Circulatory system	7.75	8.35	7.03	5.15	6.38	6.14	10.42	9.09	7.29	10.04	7.58
Respiratory system	15.43	13.65	17.80	12.58	16.33	13.90	14.06	16.22	17.50	14.96	17.26
Digestive system	9.20	10.87	8.13	12.99	10.16	9.20	9.90	7.37	7.08	8.97	7.37
Urinary system	5.21	5.57	4.40	5.15	3.98	7.36	5.21	4.18	6.25	5.34	4.63
Injuries.....	5.61	5.85	6.60	4.54	3.99	5.94	3.39	5.41	7.92	4.50	8.00
From all other causes.....	3.20	3.34	2.64	2.27	2.39	4.30	2.34	4.42	3.54	2.77	4.00

TABLE XIII.—COMPARATIVE EXHIBIT.—AVERAGE DURATION OF TREATMENT IN HOSPITAL IN EACH DISTRICT, 1880 TO 1889.

Districts.	General average.	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.
North Atlantic.....	26.94	26.64	22.67	24.86	26.60	30.13	30.22	26.56	23.89	26.76	30.05
Middle Atlantic.....	26.57	26.19	27.68	26.18	24.50	26.84	25.32	25.84	29.21	26.99	26.92
South Atlantic.....	25.79	28.52	23.80	23.20	23.70	23.46	26.06	26.72	27.99	26.53	27.91
The Gulf.....	23.01	24.55	23.60	35.25	20.10	19.97	18.63	19.43	20.82	23.24	24.55
The Ohio.....	23.95	24.57	23.88	29.22	26.50	22.56	23.18	23.61	21.87	21.62	22.52
The Mississippi.....	20.52	20.74	19.66	17.55	22.50	18.16	20.28	20.79	21.72	21.23	22.60
The Great Lakes.....	27.85	26.13	29.42	26.03	27.70	29.75	28.10	28.61	26.31	26.72	29.69
The Pacific.....	30.78	34.41	32.03	27.55	26.10	31.04	31.09	29.74	29.72	29.96	31.12

TABLE XIV.—STATEMENT OF MORTALITY OF PASSENGERS ON VOYAGES FROM FOREIGN PORTS TO THE UNITED STATES, JULY 1, 1888, TO JUNE 30, 1889.

Date.	Name of vessel.	Where from.	Male or female.	Age.	Cause of death as reported to the customs officer.
June 1	Adriatic	Liverpool	Male....	37	Suicide.
Do...	Amalfi	Hamburg	do	37	Do.
Oct. 25	America	Bremen	do	20	Inflammation of intestines.
July 14	Belgie	Hong Kong	do	27	Not stated.
May 9	Bohemia	Hamburg	Female ..	57	Heart disease.
Mar. 15	Britannic	Liverpool	do	20	Asthma.
May 31	British Prince	do	Male....	33	Dysentery.
Apr. 5	Circassia	Glasgow	do	34	Delirium tremens.
Jan. 13	City of Chester	Liverpool	do	23	Heart disease.
Apr. 6	City of Berlin	do	Female ..	22	Exhaustion.
Oct. 15	Corean	Glasgow	Male....	26	Delirium tremens.
Apr. 23	Dresden	Bremen	Female ..	60	Not stated.
Sept. 5	Donan	do	do	24	Child birth.
Aug. 25	Earnwell	Santiago de Cuba	Male....	20	Chagres fever.
Feb. 3	England	Liverpool	do	46	Dropsy.
Apr. 21	Etruria	do	do	40	Inflammation of stomach.
Feb. 26	Finance	Rio de Janeiro	do	29	Enteric fever.
Apr. 5	Gallia	Liverpool	do	22	Delirium tremens.
Sept. 13	Hammonia	Hamburg	do	27	Enteric fever.
Aug. 26	Hibernian	Glasgow	Female ..	65	Heart disease.
Mar. 22	Indiana	Antwerp	do	20	Exhaustion.
July 18	Kennard	Azores	Male....	68	Pneumonia.
July 10	Leerdam	Rotterdam	do	38	Do.
Nov. 16	Lord Clive	Liverpool	Female ..	20	Asthma.
Apr. 4	Main	Bremen	Male....	68	Heart disease.
Apr. 28	Marathon	Liverpool	do	45	Apoplexy.
Dec. 24	Marseilles	Antwerp	do	20	Congestion of brain.
Oct. 29	Mexico	Havana	do	27	Do.
Sept. 23	Michigan	Liverpool	Female ..	13	Asphyxia.
Jan. 25	Neckar	Bremen	Male....	61	Dropsy.
July 8	Neustria	Mediterranean ports ..	Female ..	21	Heart disease.
Nov. 6	Ohio	Liverpool	do	20	Septicæmia.
Do...	do	do	Male....	23	Pneumonia.
Apr. 3	do	do	do	25	Delirium tremens.
Nov. 18	Republic	do	do	30	Alcoholism.
June 17	Sarah	Fayal	do	53	Diarrhœa.
June 22	do	do	Female ..	74	Bronchitis.
Sept. 3	Sylvia	Hamburg	Male....	32	Phthisis pulmonalis.
Nov. 24	"The Queen"	Liverpool	do	40	Delirium tremens.
Apr. 14	Wacsland	Antwerp	do	47	Heart disease.
May 5	Wieland	Hamburg	do	33	Apoplexy.
May 29	Wisconsin	Liverpool	do	26	Heart disease.
Sept. 25	do	do	Female ..	20	Convulsions.
June 10	Zelandia	Sydney	do	45	Not stated.

I N D E X.

A.

	Page.
Abdomen, wound of.....	409
Abscess, perityphlitic.....	258
perineal.....	263
of brain.....	345
Psoas.....	400
Additional force needed.....	103
Alcoholism, cases of.....	308, 309
American Public Health Association.....	141
Anæmia, idiopathic.....	342
Andrada, Dr. Nuno d'.....	148
Aneurysms.....	361-365
Angeioma, case of.....	310
Animals, experiments on.....	176
Apoplexy.....	346-348
Armstrong, passed assistant surgeon.....	259, 263, 268, 271, 284
radical cure of hernia.....	249
Austin, H. W., surgeon.....	246, 248, 282
Average duration of treatment in hospital, by districts.....	469

B.

Babes, bacillus of.....	173
Bailhache, P. H., surgeon, Marine-Hospital Service, letter of.....	117
Black, Miss M. A.....	107
Bladder, pistol-shot wound of.....	266
Bratton, W. D., passed assistant surgeon.....	273
Bright's disease.....	391-396
Bureau, organization of the.....	106-108
Burgess, D. M., sanitary inspector, United States.....	154

C.

Camp Perry.....	22
Cape Charles quarantine.....	109, 130
Carcinoma, cases of.....	311-315
Carmona, y Valle, Prof.....	149, 213
zoospores of.....	216
animals, experiments upon.....	217
methods of inoculation.....	218
results of inoculations.....	218
remarks upon methods.....	219, 223
Carrington, P. M., passed assistant surgeon.....	258

	Page.
Central bureau	9
Cerebellum, tumor of	310
Cerebral membranes, inflammation of	343-345
Chagres fever, observations on, by Acting Assistant Surgeon Lehman, Marine-Hospital Service	100-103
Chest, wound of	409
Cleveland, President United States. Orders to Major Sternberg, U. S. Army	135, 136
Colitis	381, 382
Collison, George W	107
Contracts for care of seamen	120-123
Cryptococcus Xanthogenicus of Dr. Freire	155
Cystoscope, use of	259
Cystotomy, supra-public	263

D.

Delaware Breakwater quarantine station	109, 130
Diagnosis of yellow fever	17-22
Diseases pneumonic	378-380
Disinfection, post epidemic	114-116
District, ratio of seamen treated in each	418
North Atlantic	419-425
Middle Atlantic	425-430
South Atlantic	431-436
The Gulf	436-442
The Ohio	442-447
The Mississippi	447-452
The Great Lakes	452-458
The Pacific	458-464
Ratio of deaths in	468
Average duration of treatment in hospital by	469
Deaths from specific causes, ratio of	468
for years 1880-1889	469
Duodenum, perforating ulcer of	382
Dysentery, cases of	301-303
Dyspepsia, acute	381

E.

Empyæma	380, 381
Enteric and remittent fevers, collective investigation of the symptomatology of	243, 244
Enteritis	383
Epidemic diseases, expenditures for preventing spread of	129
Epidemiology	17
Erwin, Marion, United States attorney	113
Excision of wrist	282
Expenditures	129
by stations	129

F.

Fagét, Dr. C., treatment of yellow fever	22-49
Fatal cases, reports of	295-410
Femur, caries of	399
fracture of	410

	Page.
Fever, chagres, article on, by Acting Assistant Surgeon Lehman, Marine-Hospital Service.....	100-102
enteric	295-301
intermittent, cases of.....	303, 304
remittent, cases of	304, 305
Fernandina, yellow fever at, by Surgeon J. W. Ross, U. S. Navy	76-83
Financial statement	129
Finlay, micrococcus of	164
Florida legislature, resolutions by the	16
Floating cartilage in knee joint	283
Freire, micrococcus of	160
experiments of.....	178
method of making protective inoculations.....	182, 183
method of preparing cultures	183
vaccinating.....	183
vaccination, yellow fever.....	184
report on preventive inoculation for yellow fever during the epidemic which prevailed in 1883 and 1884 in Rio de Janeiro	190
Frederic, Dr. Carlos	148

G.

Gahn, H.....	107
Gainesville, Fla., yellow fever at, by Assistant Surgeon Wm. Martin, U. S. Navy ..	85-95
Geddings H. D., assistant surgeon	104
Goés, Dr. Aranzo.....	142, 194
reply to Dr. Freire.....	231
Goldsborough, Surgeon C. B., letter of.....	119
Goodwin, H. T., assistant surgeon.....	279
Griffin, Mrs. Emma.....	107
Guitéras, John, passed assistant surgeon, Marine-Hospital Service, diagnosis of yellow fever.....	17-22
resignation of.....	109
Gulf quarantine station.....	111, 130
Gunshot wound of skull.....	276
Gunshot wounds.....	404, 405
Gustin, George A.....	107

H.

Hamilton, John B., Surgeon-General, report to Secretary	9-128
letter to Dr. Joseph Y. Porter, U. S. Army.....	114
	115, 116
Havana commission, 1879, extract from report of.....	162
Health, public.....	9
Heart, valvular disease of.....	351-358
fatty degeneration of.....	358
dilatation of.....	360, 361
Hemiplegia	348-350
Hepatitis	384
Hernia, radical cure of.....	248, 249, 256
strangulated.....	383, 384
Hospital practice, selected cases from	241
Hospitals needed	120

	Page.
Hutton, Surgeon W. H. H.....	49-52, 52-60
Hygienic laboratory.....	104

I.

Ilium, caries of.....	398
Inoculations, statistical tables of.....	196-199, 205, 207
Inspection service, United States, in the epidemic of yellow fever, 1898.....	52-60
Intestinal obstruction, case of.....	257

J.

Jarvis, United States minister.....	142
Jones, Prof. Joseph.....	156
Jones, Miss E. R.....	107

K.

Kalloch, passed assistant surgeon.....	257
Key West quarantine station.....	111, 130
Kinyoun, assistant surgeon, Marine-Hospital Service.....	104, 105
Laboratory, hygienic.....	104
New York, summary of work in, by Assistant Surgeon Kinyoun.....	104, 105
Laborers and messengers, pay of.....	103
Lehman, M. J., acting assistant surgeon, Marine-Hospital Service.....	100-103
Liver, abscess of.....	245, 387, 388
cirrhosis of.....	385, 386
Lung, abscess of.....	246
Lungs, passive congestion of.....	365

M.

Macclenny, Fla., yellow fever at, by Dr. J. L. Posey.....	96-99
Maclean, John.....	107
Mallory, Miss A. L.....	107
Manatee, Fla., yellow fever in.....	60
Marine hospitals.....	116-120
Baltimore.....	117
Boston.....	117
Cairo.....	118
Chicago.....	118
Cincinnati.....	118
Detroit.....	118
Evansville.....	118
Key West.....	118
Louisville.....	118
Memphis.....	118
Mobile.....	118
New Orleans.....	118
Portland, Me.....	119
Port Townsend.....	119
St. Louis.....	119
San Francisco.....	120
Vineyard Haven.....	120
Wilmington, N. C.....	120
Martin, William, assistant surgeon, U. S. Navy, yellow fever at Gainesville.....	85-95

	Page.
Meany, Mrs. F. F.....	107
Medical Corps, changes in the.....	109
Meningitis, tubercular.....	315
Messengers and laborers, pay of.....	108
Montgomery, Ala., quarantine conference at.....	10-16
Mortality, causes of.....	466-468
of passengers on voyages from foreign ports to the United States.....	470
Myelitis.....	345

N.

National quarantines.....	109, 112
Necropsies, reports of.....	295-410
Nephritis.....	389-391

O.

Organization of the bureau.....	106-108
---------------------------------	---------

P.

Parks, William S.....	107
Patients treated, number of.....	413
Pelvis, fracture of.....	408
Pericarditis.....	350
Peritonitis, traumatic.....	388
Pernambuco, yellow fever at.....	145
Plant City, Fla., yellow fever in.....	60-76
Pneumonia, lobar.....	366-377
Pons varolii, syphilis of.....	284
Porter, Dr. Jos. Y.....	114, 115, 116
letter of Surgeon-General Hamilton to, relative to disinfection.....	114
Port Townsend quarantine station.....	111, 130
Posey, Dr. J. L., relative to yellow fever at Macclenny, Fla.....	96-99
Post epidemic disinfection.....	114-116
Protective inoculations in yellow fever, history of.....	234-239
Public health.....	9
Purpura, hemorrhagica.....	342
Purveying division.....	105

Q.

Quarantine conference at Montgomery.....	10-16
appliances.....	103
Quarantines, national.....	109-112
Cape Charles.....	109
Delaware Breakwater.....	109
Gulf quarantine.....	111
Key West.....	111
Port Townsend.....	111
San Diego.....	111
San Francisco.....	112
South Atlantic.....	112
Additional legislation needed.....	112
Quin, Miss D. E.....	107

R.

Page.

Relief furnished	120
Rheumatism, cases of	309, 310
Rib, necrosis of	401
Ribs, fracture of	405-407
Rio de Janeiro, epidemic diseases	143, 144
mortality from yellow fever	145
Ross, Surgeon J. W., U. S. Navy, on yellow fever at Fernandina	76-83
Rowland, John C.	107
Ruiz, Dr. Daniel, experiments of	166

S.

San Diego quarantine station	111, 130
San Francisco quarantine station	112, 131
Sarcoma of thigh	273
Sawtelle, Surgeon H. W.	245, 283
Sclerosis of spinal cord	346
Scrotum, gangrene of	398
Scurvy, case of	307
Seamen, contracts for care of	120-128
physical examinations of	418
treated during year ended June 30, 1889	418-470
ratio of, in each district	418
North Atlantic district, patients treated in	419-425
Middle Atlantic district	425-430
South Atlantic district, patients treated in	431-436
The Gulf district, patients treated in	436-442
The Ohio district, patients treated in	442-447
Mississippi district, patients treated in	447-452
The Great Lakes district, patients treated in	452-458
The Pacific district, patients treated in	458-464
The quarantines, patients treated in	464-465
Septicæmia, case of	307
Service, operations of	414-417
Skull, fracture of	279, 402, 403
Sorrells, Miss A. J.	107
South Atlantic quarantine station	112, 131
Spine, dislocation of	407
Starbuck, Theodore, acting assistant surgeon, Marine Hospital Service	83-85
Statistics, United States Marine Hospital Service	413-470
Sternberg, Surgeon George M., report	133
orders from President	135, 136
letter of transmittal to the President	137
conclusions of	224, 225
reply to Freire	225-233
Styer, Charles, acting assistant surgeon, Marine Hospital Service	276
Sun-stroke	402
Surgical operations, report of	289-292
Syphilis, secondary, cases of	305-307

T.

Tampa, yellow fever in	60-76
Thompson, Hugh S., Acting Secretary	149, 233

	Page.
Tubercle of lungs	316-340
intestine	340, 341
mesentery	341
Tuberculosis, acute miliary	315
with chronic peritonitis	316

U.

Ulcers of leg	401
Urethra, stricture of	396-393
Urquhart, passed assistant surgeon, death of	109

V.

Vera Cruz, mortality from yellow fever at	151, 152
Vertebra, re-section of, for fracture	271
Vertebræ, caries of	400

W.

Wall, Dr. John P., article on yellow fever in Tampa, Plant City, Manatee, and Palmetto	60-76
Wertenbaker, assistant surgeon, Marine Hospital Service	266
Wheeler, William A., passed assistant surgeon, radical cure of herina	256
Windom, Hon. W., report to	128
Worcester, W. P.	107
Wyman, Walter, surgeon, Marine Hospital Service	107

Y.

Yellow fever, diagnosis of, by Passed Assistant Surgeon John Guitéras	17-22
treatment of, by Dr. C. Fagét	22-49
United States inspection service in the epidemic of, by Surgeon W. H. H. Hutton	52-60
at Tampa, Plant City, Manatee, and Palmetto, by Dr. John P. Wall	60-76
at Fernandina, Fla., by Surgeon J. W. Ross, U. S. Navy	76-83
by Acting Assistant Surgeon Starbuck	83-85
at Gainesville, Fla., by Assistant Surgeon William Martin, U. S. Navy	85-95
at Macclenny, Fla., by Dr. J. L. Posey	96-99
prevention of, by inoculation	133
at Pernambuco	145

9895.

5-1.



U. S. Public Health Service
Annual Report of the Surgeon
General.

c.1

1889

